



FRIDAY, JANUARY 19.

## Contributions.

## Railroad Economics as a Pseudo Science.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Jan. 5 I find a long article from Mr. Wm. P. Shinn, M. Am. Soc. C. E., on (what is not) the cost of a grade crossing stop.

I am "filled with amazement" at the character of the article, that instead of using facts and arguments to show what is the cost of the grade-crossing stop, the writer should have become wild with flat contradiction, ridicule and personal abuse. I submit it to the candid reader to judge whether the course pursued in that which scores high credit marks, and furnishes assurance of cultured manhood; whether it is nobler to present figures calculated to establish an important proposition, differ if it will from the results of another, or to become a deserter to the commands of reason, and, acting on a mere impression, to fly with annihilating intent, not only at figures based upon premises, but their author also.

Had Mr. Shinn employed the power of concentration (?) evinced in this article to fill a tenth part of the space, of over five columns, occupied by this article, with new facts and figures, he probably could have redeemed the other nine-tenths. But no, he could not "now undertake to show what is" even "the approximate cost of the grade-crossing stop," because the space is judged to be in greater need for destructive purposes than for figures which "may be made the basis of business transactions involving large interests." Had Mr. Shinn been less hasty, and instead of using a cudgel, had used an ordinary pen, he probably would have avoided some bad ink stains.

If he objects to the premises, why not show how to obtain better?

As to the bald guessing of \$100 per day, of the cost of stops at a single grade crossing, I may state that if it is a guess it is not my own. The figure was obtained from a railroad man of large practical experience, for which reason it was considered of sufficient value to present.

Exception appears to be taken to estimating the cost of the stops in terms of the time lost in making the stops.

This element depends upon the question of supply and demand. Railroad blockades are of occasional occurrence if not frequent, indicating that we now have none too many railroads, and so it will be 10 years hence. If appliances come into general use within five years from the present for avoiding the stops at crossings, then we may safely predict that 10 years from the present time there will be less miles of railroad than if the stops have to be made. The existing roads will then have the benefit due to making the crossings at speed. Any one road of given length, given rolling stock and operating force will thus realize higher earnings in proportion to the gain at the crossing. In estimating this gain, the time lost at a stop was found, and then, on the supposition of that time being used in running instead of stopping, it was counted as amounting to the earnings of that additional run. This seemed fair, from the fact that the road now carries more freight than it would if the stops were made.

The time saved was concluded to be somewhat over that required to run a mile. Allowing a mile for it, then it is a question whether the gain is to be counted in earnings or cost of operating a mile. My opinion was and is, that it should be earnings, and I called it cost of the stops because in making the stop we are that much short according to the above.

If, however, we take it in cost of operating, we find authority for figures leading to as high results as any I have given. In *Van Nostrand's Engineering Magazine*, vol. X., page 470, we can quote from O. Chanute, C. E., for total cost of operating freight trains at from \$0.88 to \$1.92 per mile. These figures are given by a prominent railroad engineer as cost. Also I have it as testimony of a railroad man (and the combined evidence of three men), that a mile, including a crossing and its stop, costs from 15 to 25 per cent. more to run than does a clear uninterrupted mile. Adding these percentages to the above named costs per mile, and taking the sum for the cost of one mile lost at the crossing, we have, for the cost of the stop:

Total cost.....	\$0.88 to \$1.92
Per cent., 15 to 25.....	0.13 to 0.48
Minimum and maximum.....	\$1.01 and \$2.40

figures within which all of my previously published results for this are found to fall.

If we add 50 per cent. to change the above to earnings, we have \$1.50 and \$3.60.

As to the objection to the statement that \$500,000 will cut a mile of tunnel, I cite figures in *Van Nostrand's Engineering Magazine*, vol. VIII., page 284, where the cost per mile for one tunnel is given in amount about \$255,000, and for six different tunnels cited the average is \$490,000.

As to the ridicule thrown at the range of values of my figures, I think it will be conceded that my figures will compare favorably with estimates of great number of engineering works, if the final costs of those works can be taken as the basis of comparison. One tunnel is estimated at \$200,000 and costs \$350,000. How is it with the Hoosac Tunnel and the East River bridge? S. W. ROBINSON.

## What the Car Service Might Be.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The present scarcity of cars for freight is partly due, no doubt, to activity in freight movement, but the present stock of cars would doubtless be amply sufficient if they were kept properly at work.

This assertion is not made of any particular road, but of the car service of the railroad system as a whole. Without question the organization and operation of the car service department is very imperfect; and on a large number of roads there is no organization at all.

There are departments in railroad service whose advantages must be experienced before they are at all appreciated; these are especially departments of supervision. For example, many roads are still ignorant for lack of the experience, of the advantage of a thorough system of accounts supervising by record all parts of the service, and therefore such organization of accounts is considered unnecessary. In making these remarks it should be understood that the matter of time and circumstance is not left out of account; in the organization of railroads what is necessary to a large and complex system would be an incumbrance to a small road.

Car service, however, involves the interests of all railroads; and even those small and local lines which do not allow their cars to go from their road are interested financially in an efficient service for the whole country, since this rule (which may now be a wise one) obliges them to do an amount of hauling of foreign empty cars entirely unnecessary. Small roads with, let us say, 500 cars, have in a large majority of cases, no car service department whatever; larger roads have departments more or less complete, but all without exception, it is claimed by their heads, crippled in service and, what is equally important, in ambition by very limited assistance. It may be worth while, therefore, to consider from a practical point of view what a car record department might be and what advantage the road, and specifically other departments, would receive from it if properly organized and efficiently conducted.

The movement of freight may be said to be the main object of railroad business; so long as this remains the case the movement and supervision of freight cars will remain a very essential part of the duty of receiving all freight offered and of forwarding it rapidly and safely, in faithful performance of all time contracts made thereon. Prompt shipment and early delivery of freight are among the strongest inducements that a line can offer to shippers to attract their patronage, and inefficiency in this respect may cause serious losses. A single delay involving only a few days may lose the business of a large shipper, especially where half a dozen car-loads of freight arrive the next day after the bulk (shipped on the same date) has left New York harbor by steamer. Of course, this is a mild exaggeration to give a definite point, but it clearly illustrates the principle that the soliciting agent is dependent for solid arguments upon an efficient supervision of cars.

This duty, however, is supposed to fall, in some measure, upon the division superintendent; but any man is relieved from blame, if not from responsibility, if he has not the means to fulfill the duty imposed upon him. A part of the superintendent's duty falls naturally to the department of car service, because this department has already, and should have still more minutely, a knowledge of the facts. Moreover, while the general superintendent has supervision over all division superintendents, on the large roads this power does not give him supervision over details except so far as he has the facts of what from day to day and hour to hour is being done; in other words, in any efficient organization of a railroad, practical supervision by subordinate departments becomes quite as necessary as executive power; and as a rule an executive officer should be at the head of such an office as will relieve him from the details and yet place him in immediate knowledge of all the facts of the working of that portion of the road over which he is placed. For this reason the car-service department, as a department subordinate to the general manager, should have a certain delegated authority over the movement of cars on all divisions, but to a very limited extent. This authority, let us suppose, should extend over freight cars as follows:

1. While the executive officers of the road may know what cars are at a certain station, it is not too much to presume that they know nothing as to the details; such details as that there are at a given point certain cars of eastern foreign roads, and cars of western foreign roads, also other cars needed for local service. Hence, if an economical service is to be performed by these cars only, the department having knowledge of the facts can direct as to order of loading for eastward, westward, and local points.

It is a sound principle that responsibility must not be left with those doing absolute work. All kinds of rules, in other words, without supervision as to what is to be done with them end in loading, for whatever point, those cars which come first; and we may add, in getting through on pressing order those cars most easily dispatched. In saying this we give full credit to that intelligence and faithfulness in the ranks which has made American railroad service so efficient with so few minds to direct and so little formal organization; our remark illustrates (by some exaggeration) what will become necessary in improving the efficiency of the service above the point at which it has arrived by the more natural method of every man being called upon to do as well as he can under the circumstances.

The proper loading of foreign cars first and foremost for their immediate and direct homeward route may be called one of the very fundamental principles of an improved car service; the economy of the road's own cars on its own track

is another: no home car should be sent to a foreign road under any circumstances while a car of that road or vicinity remains to be sent in its place. Simple as the principle seems in statement, if faithfully carried out on all roads there would be no scarcity of cars to carry freight even under the present pressure. The divergence of cars from their direct homeward route is largely the cause of delay in reaching home, and under a proper system of supervision could be almost entirely prevented.

2d. Time freight which the road has contracted faithfully to deliver needs special supervision, not merely by divisions, but at all junction and terminal points throughout the entire road. It cannot be expected that the divided authority of division superintendents will always efficiently do a work which needs perfect harmony at many points.

The car record department has knowledge of the facts which show the source and reason of any failure to fill such time contracts, information of especial value for those who bear complaints of damage and loss en route and negotiated for settling such damages.

The car service department alone has knowledge of all the facts of car movements, and by these facts (supposing the system to be efficient in all its detail) is able to show who had control and responsibility at any point during the whole time the freight was upon the track of the road. On some roads, when it has become a necessity to effect the prompt movement of time freight, the control of this movement has been placed in the car record department, with the best results.

The car record department needs, however, an accurate report not merely from the open track of the road, but from every siding and every possible point where the car can be and is moved. Preliminary to this it is absolutely necessary that the geography of the road down to the most minute details of sidings be recorded by such a system as is already in use on the Pennsylvania Railroad, which by simple figures and letters not merely gives the distance but the absolute position on the track. Such a map having been made, it remains only to require a report of the movement of cars by road or switching engines, or by whatever power moved, the man in charge of the motor being responsible as the conductors of trains are responsible for reports of each and every movement. Strange as it may appear to an inexperienced mind, the loss of cars on the tracks of a city is not an infrequent matter; and in disputes frequently arising as to time and place of delivery of freight, such knowledge as would be furnished by these reports has a value experience these alone could estimate. The cost of such increased details would not be considerable.

3. It is already the practice of some roads not to allow partly loaded foreign cars to come on their tracks, or their own cars partly loaded to leave their road, until the permission of the car record department has been obtained. An eighth or a sixteenth of a car load, in a foreign car which must be carried to a point from which there will be no return freight, involves an expense to the road frequently more than equal to the return it receives for carrying the freight.

For these reasons, and to prevent the return over its tracks of empty cars which have earned it nothing, the car service departments need a control which they alone can exercise with discretion. Rules in railroad affairs need to be principles exercised by a discriminating and trained mind, having immediate knowledge of a considerable past as well as the immediate present. Railroads in this country have never had that excess of form and system often complained of on foreign railroads; they have existed solely to do business and to move freight as best they could under the circumstances, without taking into consideration all the possible difficulties, and meeting these by devices of organization. This has led to an exaggeration of the doing of a thing, and only at the present day is method and economy in operation seen to be essential. Supervision and accurate record for purposes of supervision and correction are properly valued. C. C.

## Repair Shops of the Richmond &amp; Alleghany Railroad.

The plans of the repair-shops of the Richmond & Alleghany Railroad at Richmond, Va., are particularly noteworthy for the compactness and good disposition of the ground floor, careful detailing and permanent character of the work. These shops are intended to serve as repair-shops at the Eastern terminus of the Richmond & Alleghany Railroad, which runs from Richmond, Va., westwardly towards the Alleghany mountains. The site is in a gully, known as the Penitentiary Bottom, formerly covered to a great extent by a pond, and used as a boat-yard for the James River Kanawha Canal. Hence pile foundations had to be used, after filling ground to grade. The design calls for a 14-stall round-house (one quadrant) from the third stall of which a wing runs back, parallel with the centre line of first stall, containing a machine shop 40 by 75 ft. and a blacksmith shop 40 by 52 ft. On one side of the machine shop a small wing is attached containing an engine and boiler room, 25 ft. 6 in. by 30 ft. 6 in. The shops are situated in the Y formed by the main line, running along the canal in front of the round-house, and by the freight-yard, branching off from the main line and running back in the Penitentiary Bottom. The turn-table track branches off from main line, and between it and the main line a sand-house and water-tank are located and constructed so as to be used from both tracks. The round-house serves as repair and erection house and also for housing locomotives in service. The track through the first stall, on the opposite side from freight yard, is continued as the shop track proper through the round-house parallel with the machine and smith-shop back to a material yard, wrecking and storage tracks. Alongside



DESIGN OF ROUND-HOUSE & SMALL REPAIR SHOPS.

RICHMOND, VA.

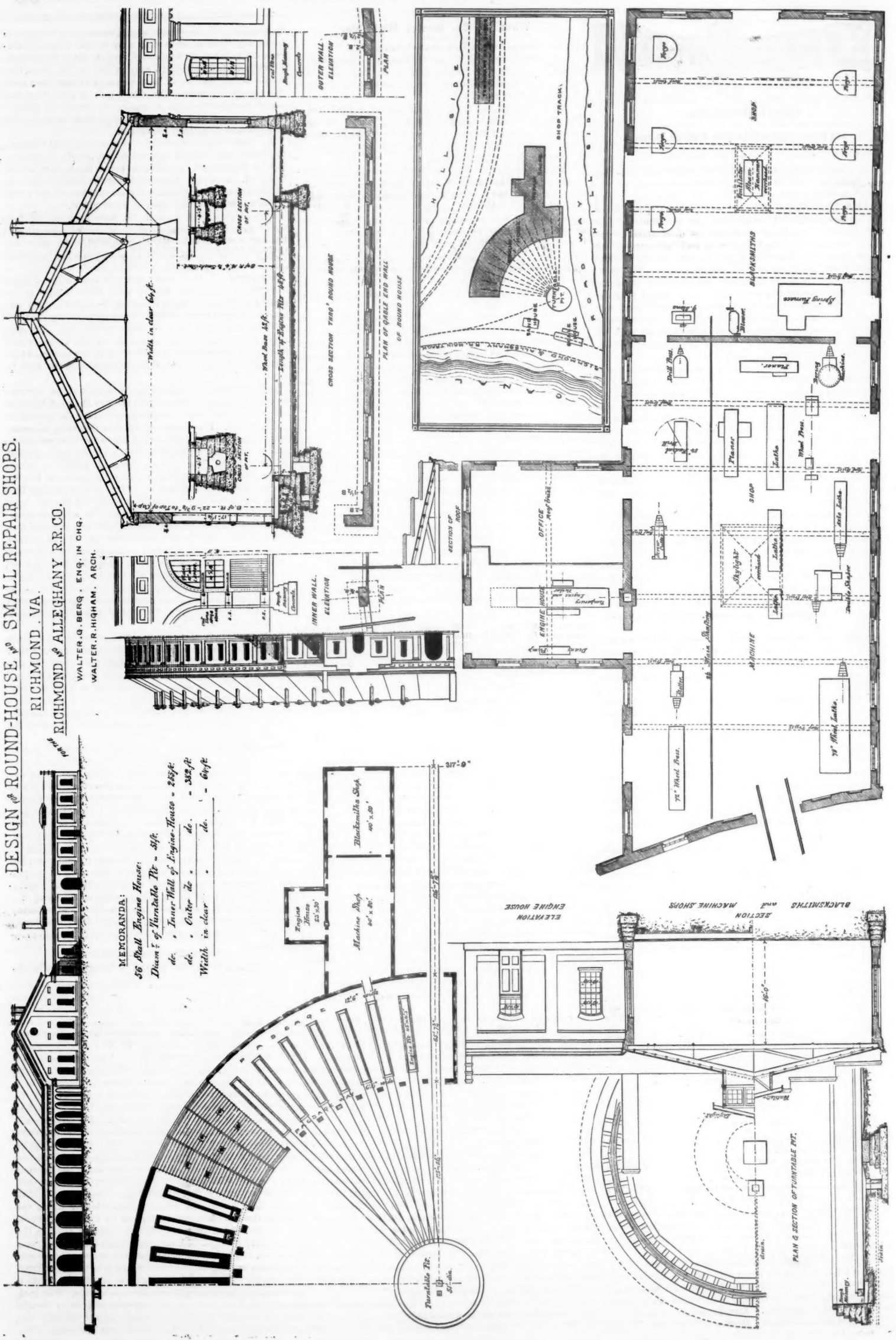
RICHMOND & ALLEGHANY RR. CO.

WALTER G. BERG, ENG. IN CHG.

WALTER R. HIGHAM, ARCH.

MEMORANDA:

56 Steel Engine House:  
 Diam. of Turntable Pit - 58 ft.  
 do. of Inner Wall of Engine-House - 25 ft.  
 do. of Outer do. do. - 31 ft.  
 Width in clear do. - 64 ft.





his track a small carpenter-shop, with pattern-shop overhead, and a paint-shed will be suitably located. If power should ever be required in the carpenter-shop, it will be limited, and can be supplied by a wire rope from the machine shop. Truck and car-wheel work is facilitated by the disposition of the proper machinery in connection with the car-wheel track in front of the machine shop and the track entering the machine shop from the third stall of round-house, as shown on plans. The nearest freight track in the yard will serve as *outer shop track*, connecting with the material yard and storage tracks at the rear of the shop system and will allow coal and other supplies for the engine and smith shop to be unloaded directly where required, and in crowded seasons can be used for standing cars requiring light repairs.

The choice of a round-house with 393 ft. diameter and 56 stalls to the full circle was caused by the necessity of having as many stalls as possible in one quadrant, the site being limited. The exact diameter was determined by the requirement that the track from each stall to the turn-table should allow a locomotive, a coach or two flat cars to stand in front of the stall without blocking the tracks to the neighboring stalls. In this manner the standing capacity of the tracks has been more than doubled, especially for repair work. The tracks in the building have a downward grade towards the turn-table of  $\frac{1}{4}$  ft. in 100, and in front of stalls  $\frac{1}{2}$  ft. in 100, to facilitate a speedy removal of cars and engines in case of fire.

The following data may prove of interest: Round-house, 56 stalls; radius of centre of inner wall, 125.65 ft.; radius of centre of outside wall, 191.46 ft.; diameter of turn-table pit in the clear, 51 ft.; depth of turn-table pit at circumference, 5 ft.; at centre, 7 ft.; inside measurement of house in the clear, 64 ft. Walls of round-house from ground to eaves 23 ft., at gable end 17 ft. higher; centre to centre of pilasters outside wall 21 ft. 5 $\frac{1}{2}$  in.; centre to centre of piers, inside wall 14 ft. 1 $\frac{1}{2}$  in. Thickness of outside wall 2 bricks, at top and at pilasters 2 $\frac{1}{2}$  bricks; piers, 3 bricks throughout. Engine pits, length 45 ft.; distance of edge from inner wall, 6 ft. 6 in.; from outer wall, 12 ft. 6 in.; depth, 3 ft. and 2 ft. 6 in. Ro. f-trusses all iron; pine purlins supporting slate roof, 2 $\frac{1}{2}$  by 12 on inner slope of roof; 3 by 12 outer slope, spaced about 28 in. Centre of smoke-stacks about 17 ft. from outer wall, stacks telescopic, 20 in. diameter, with double hood on top and expanding cone at bottom 3 ft. 16 in. diameter and 3 ft. high. Sheet iron ventilators over each stall are 24 in. diameter, with single hood on top. Each sash contains 24 lights 10 ft. 18 in. The round-house doors are semi-headed folding doors, batten framed up to a height of about 7 ft., above which they are glazed and hung with strap-hinges to hooks built into piers.

Machine and smith-shop: Walls, 1 $\frac{1}{2}$  bricks thick on top and at pilasters 2 bricks. Tinned gable roof 4 ft. 6 in. rise, supported by trusses every 10 ft. 7 in. Gable end walls are benched off in parapets with granite coping. Over machine shop there is a glazed ventilator 12 ft. by 6 ft., provided with movable, pivoted sash, worked from below; over the smith-shop there is a louvered ventilator 13 ft. by 10 ft. The chimney to the engine is 4 bricks by 4 bricks, and is carried up 19 ft. above the roof. Each sash contains 32 lights 10 by 10 in. All the large folding-doors are semi-headed, 8 ft. wide by 11 ft. high, batten framed and with  $\frac{1}{2}$ -in. ceiling nailed diagonally. All connecting doors between the shops are plain batten square doors 3 ft. by 7 ft. with semi-circular transoms. The height from floor to the underside of tie beam is 16 ft. The machine outfit and shafting are shown on the drawings and represent in general the requirements for a shop system as illustrated.

The shops and yard were designed and constructed under the supervision of Walter G. Berg, Engineer in charge, assisted by Walter R. Higham, Architect. The machinery, its distribution and interior arrangements, were determined by Geo. D. Harris, Master Mechanic.

#### Report of the Western Railroad Association.

We give below in full the more important part of the report of the Executive Committee to the Western Railroad Association for the year 1882, with a summary of the remainder:

The year has been conspicuous for the final determination in your favor of the famous Tanner Brake litigation, for the announcement therein by the Supreme Court of the United States of very important legal principles and rules for which we have long been contending, and for the dismissal not only of the 38 suits under that patent, but also of other important suits to which that announcement applied. The year has also been remarkable for the uniform compliance by the membership with all advices given by the Executive Committee as to where not to purchase supplies on account of difficulties of infringement. Great benefits have been derived therefrom: First, in that the members have been fully released without any cash outlay on their part from accrued damages in a very considerable amount on account of past infringements in which they have been involved by purchases in open market; second, in that a larger number of manufacturers, supply agents and owners of patents have been induced to co-operate with the Association in its efforts to recognize and properly to arrange, in advance, for valid patents and to defeat invalid claims; and third, and specially, in that the experience of the year has resulted, we believe, in the firm establishment of the rules governing the liability of manufacturers and supply agents to us and to each other in the premises, which rules were formulated by your Executive Committee for the year 1880, and were adopted at the annual meeting held Jan. 12, 1881.

Seven new suits have been commenced during the year. One of these is a swage block case, another has been dismissed at complainant's costs, and a third was settled for a reasonable amount very soon after it was commenced. In the four remaining cases, we, on good references, declined to entertain the claims sued on before the suits were commenced, and we are now advised by the General Counsel that none of them can be maintained.

The number and variety of the subject matters upon

which the members have been advised have been greater than during former years. The character and amount of our expenditures have been about the same as heretofore. Nothing is left to be desired in the harmony which has attended all the counsels and work of the association.

We also note with pleasure, and speak further on, of the reorganization during the year upon a representative basis of the Master Car-Builders' Association.

During the year, upward of 2,000 letters have been written; 360 written opinions have been given, involving 195 different subjects matter; 55 cases have been finally disposed of, and five of the seven cases commenced during the year are still pending, thus leaving 28 suits pending at the end of the year; \$27,300.83 have been received, which, added to \$6,149.73, the balance at the commencement of the year, equals \$33,350.56; \$28,061.50 have been expended, including \$500 paid in final settlement of the Tanner brake litigation, leaving a balance at the end of the year of \$5,289.06. Two companies, the Western Railroad of Alabama and the Atlanta & West Point Railroad, withdrew at the end of the year; one company, the Evansville & Terre Haute, will not hereafter appear on our list by reason of its consolidation with the Chicago & Eastern Illinois Co., which latter company is a member of the association, and one company, the Burlington & Ohio River, has defaulted in the payment of a part (\$60.75) of its assessment. The present membership numbers 78 companies, operating over 52,000 miles of road, over 250,000 cars, and over 8,000 locomotives.

The experience of the years 1880, 1881, and 1882, has amply demonstrated the wisdom of attempting by discriminations in giving orders for supplies to adjust, at least as far as the railroad companies are concerned, all patent legal differences between manufacturers of devices which are used or desired to be used, and to hold all manufacturers and supply agents to a strict account as to all valid claims made against devices already in use which were furnished by them. As already stated, it is believed that the experience of the past year has demonstrated the fairness of the rules in the premises adopted in January, 1881, and that they have now become fully established.

Several such matters have been adjudicated during the year, of which the members have been fully advised by circular letters, with duplicates for instructions to the heads of departments. Two illustrations will suffice here.

The regular delivery to the cylinders of our locomotives of the proper amount of a good lubricator at the proper times has been demonstrated to be almost, if not quite a necessity. This is claimed to involve the use of what is called "the visible or sight feed principle," for the patent right to which two manufacturing companies have been contending in a multiplicity of suits and cross-suits. One of these companies during the year sued one of the members of the Association which had purchased from the other company. Upon a thorough examination of the documents and affidavits submitted by both companies, we were unable to come to any satisfactory conclusion as to which was in the right. Our friendly offices were tendered to effect a full settlement between these companies upon the basis of an exchange of licenses each to the other, but without practical avail. Under penalty of debarring both companies from the trade of the members of this Association, we required that they should both in writing protect our members and save them harmless from any purchases, past or future, from either and both companies. This one of the companies for a time declined to do, whereupon a circular letter was issued to the members accordingly. The adoption by our members of the recommendation of that circular demonstrated the power of the Association to determine such matters, and resulted in the acquiescence, in writing, of the manufacturing companies referred to not only in the force of such recommendations by your Executive Committee, but also in the propriety of the actions of your officers in the premises. Both of these companies have contracted not to sue any present or future member of this Association under any of the patents upon cylinder lubricators now or hereafter owned by them.

The seventh of the standing rules of the Association, being one of the rules in the premises adopted at the annual meeting held Jan. 12, 1881, is as follows:

"If the manufacturer desires to introduce an element or device into the car or locomotive which is not specified, the which may form a part of his standard, and concerning the patent relations of which he is in doubt, he may, through the company giving the order, refer the question to this Association, which will give to the company and to him safe advice in the premises."

The question has been asked, but not under circumstances which required an answer on our part. What responsibilities or obligations are assumed by the members of the Association in case of giving advice to the railroad company, and through it to the manufacturer, that they are safe in making and using any device so submitted?

Among the considerations which should dictate the answer to this question, we suggest the following: First, the prerogatives of the Association are only advisory, and its officers have no authority to assume any contract obligations, except so far as the future action of the Association itself may be involved, and has no authority to bind any of its members to the future performance of any contract whatever; Secondly, the real and primary obligation is with the manufacturer. One of the principal objects of the efforts of the Association here referred to is to stop infringements of valid patents at their fountain head—that is, with the manufacturer—to require that he shall give such preliminary attention to these questions that the railroad companies shall be safe in purchasing in the open market, and shall not be held responsible for infringements caused in the first instance by the manufacturers. The Association should be ready at all times to give them all information and assistance possible to this end, and for this reason, as we understand it, this rule was properly adopted. It is difficult, however, to see why the railroad companies should assume any responsibility in the premises, for, and in the third place, it goes without saying that commercially, whatever may be the law, when a device is purchased from a manufacturer or supply agent, the right to use it is purchased from him as much as in the wood, the iron, or the brass of which it is composed.

The second instance referred to is an adjustment of important claims made by Messrs. Hicks & Smith of New York, against the other manufacturers of car lamps, and indirectly against a number of the members of the Association. The claim allowed, and under which a settlement has been made at our instigation by the manufacturers who had infringed, was for a central oil font, with two or more branching arms and oil tubes, all detachably connected to the frame which holds the shades, so as to be readily detached for cleaning, filling and trimming, the oil pot being thus located centrally, so as to cast no shadow below. The following corporations have made a full and satisfactory settlement for the past with Messrs. Hicks & Smith upon equitable terms, the members of this Association being fully released for past infringements, to-wit: The Adams & Westlake Manufacturing Co. of Chicago; Post & Co. of Cincinnati, and J. L. Howard & Co. of Hartford, Conn. These corporations and Messrs. Hicks & Smith, and they only, are authorized at the date of this writing to make and sell

lamps coming within the description given above. This matter was finally adjusted during the month of December, 1882.

Scientific and practical experimenting on different roads and under different conditions, with both old and new devices and processes pertaining to the maintenance and operation of railroads, and the comparison of the results of such experiments—better and more economical facilities for ascertaining which is the best of the many improvements which are presented in the many arts pertaining to railroads, and a *modus operandi* of introducing such improvements at a minimum cost and without unnecessary delay, are as yet unsolved and very important problems. The utter lack as yet of uniformity, even upon connecting roads in the devices most used by them, results *per se* in an expense, in the repairs of foreign cars alone, which may be avoided, of hundreds of thousands of dollars annually. Not infrequently in the matter of dead-blocks, running boards, brake-staffs, on freight cars, the height of cars and the height of draw-bars, this lack of uniformity and standards results in accident and death. The employment by the managers of the proper persons and the proper methods to determine upon standards in the more prominent of the devices put into freight cars, and to secure their introduction, even if the standards determined upon should not be the very best that might be selected, would alone obviate a very large annual expenditure, and would materially decrease accidents to persons and property.

The Railroad Gazette for June 23, 1882, estimates the average annual mortality and increase of cars at 17.7 per cent. This represents an annual cash expenditure for the next few years, based upon the present number of cars, of about \$50,000,000 annually for renewals and additions in the car departments. The operating expenses of the railroads of the country for the year 1880, as given by Poor, amounted to about \$450,000,000. The minimum estimate, gathered from conservative persons well qualified to judge, of the increase of value in cars to be built, and of the decrease in the present operating expenses which would result from the adoption of standards in a few of the more prominent parts of freight cars, would amount for the former to 2 $\frac{1}{2}$  per cent., or say \$1,250,000, and for the latter (decrease in actual operating expenses) to one-quarter of 1 per cent., or \$1,125,000 thus aggregating \$2,375,000 as representing an actual cash gain which would be annually realized from competent examinations and experiments, which should result in the adoption of half a dozen standards in the construction, repairs, and operation of freight cars.

Again, while the principal aim of this Association is to avoid difficulties of infringement, and by the leverage of discriminations in giving orders for supplies to force all manufacturers and supply agents to do the same, still the result is, and by law must be, that valid patent rights must be paid for, whether by the railroad companies or by the manufacturers. They must be paid for not in proportion to the full value of the improvements, but relatively to their commercial value, and also to the cost of their development and introduction. It is a fact, which well informed persons will not attempt to dispute, that as to the principal improvements in the arts relating to railroads, more money is spent, as a rule, in their development and introduction than ought to be paid for their entire use. When a crude, attractive, but unapplied improvement is presented to a cautious manager, his first thought is: "Let some one else experiment with it first on some other railroad, and if he is successful I will try it." The delays and difficulties first in obtaining competent experiments with promising and theoretically valuable inventions, and second, even after they have been successfully experimented with once, twice, yes a score of times, the delays and difficulties in securing their adoption upon a reasonable royalty, which in the aggregate shall yield to the inventor that reward which the law and a sound public policy promise him, are matters which are now worthy of serious consideration, the present thought being that the user—the railroad companies—under the present methods, or rather the present absence of methods, are obliged directly or indirectly to pay and pay roundly for these delays and difficulties, and also to seriously suffer because they are not overcome.

Any regime which shall raise to a maximum the means of ascertaining the most desirable improvements, and shall reduce to a minimum the delay and expense of their introduction, will be of incalculable value alike to meritorious inventors and to those charged with the operation of railroads.

During the year 1879, four experiments with new devices were tried under the immediate direction of the officers of this Association, and reports thereon were submitted which contained sufficient reliable data to base action upon. While this work was recognized as one of importance which called for careful attention, it was deemed unwise to attempt to accomplish it directly through the Association, and it was thought that this Association should be strictly confined to such matters as directly result from the legal patent relations of the devices in use and desired to be used. In this conclusion we concur. The American Railway Master Mechanics' Association and the Master Car-Builders' Association have been for many years giving these matters special attention, but with final results not at all satisfactory to their members, and without the co-operation of the managers in the adoption and carrying out of the results of their investigations. In June last, the Master Car-Builders' Association was reorganized upon the basis of a representative membership having written authority from their superior officers, and being entitled to a number of votes in the recommendation of standards, etc., proportionate to the number of cars represented. In October, at an adjourned meeting, the constitution and by-laws were revised, one of the provisions adopted being as follows:

"All reports, resolutions and recommendations involving the use, or proposed use, by railroad companies of any device or process which forms the subject matter of any existing patent, shall first be submitted to the Executive Committee, and shall be submitted to the Association only by the Executive Committee."

The last few months have developed quite serious objections to the public discussion and determination by railroad representatives of the mechanical merits of any such improvement, until after its legal patent relations shall have been ascertained. It is preferable that the investigations of the committees of the associations named should take a wide scope and should precede the determination of the patent questions involved, but it seems necessary that these patent questions should be determined before the results of such investigations are publicly discussed and adopted by railroad companies or by their representatives.

It will be noticed that the provision above quoted gives the Executive Committee of that Association an opportunity to obtain the necessary information preliminary to its discussions and recommendations.

We submit for your consideration and without further comment the following:

"Resolved, That the objects and methods of the Master Mechanics' and the Master Car-Builders' associations be given our continuous and careful attention and co-operation, and that in the future our Executive Committee may, at their discretion, furnish their officers from time to time



with such advice and instructions as may grow out of the questions which are determined by this Association."

#### LITIGATION.

Under this head the report gives a long and interesting history of the famous Tanner brake cases, which have been finally disposed of by the decision of the United States Supreme Court in the case of Root, Executor, against the Lake Shore & Michigan Southern Co. This decision also involved the dismissal of eight suits brought by D. W. Vaughan under the Hodge brake patent of 1849. The report continues:

The suit of Thomas C. Thomas, under the Barker & Thomas grain door patent of 1870, against the Chicago, Rock Island & Pacific Railway Company, was dismissed early in the year. That patent was purchased by Mr. D. F. Van Liew, the owner of the Van Liew grain door patents, and he executed a release for the past, and a full license for the future, to all present and future members of this Association, to use the exact grain door described in the Barker & Thomas patent of 1870, without cost to the railroad companies, thus once and for all ending all claims which might otherwise be made under this patent. The full license and release thus executed by Mr. Van Liew relates only to this Barker & Thomas patent, and does not by itself give any rights under his other grain door patents.

With reference to the case of Hayes vs. the Chicago & Alton Railroad Co., we have with regret to announce the death, during the year, of Mr. S. J. Hayes, for many years Superintendent of Machinery of the Illinois Central Railroad. He was one of the oldest, ablest and most conscientious master mechanics of the country, and his advice and assistance to us have been of value in many matters. Long prior to his death, this patent controversy had been practically taken out of his hands for speculative purposes by other parties, who for some time had been the real plaintiffs in the case. The case is without any merit whatever in law or fact. We regret the necessity of being put to any expense in defense of claims of this character. We are confident that the only interest the members of the Association have in the case is the necessary expense of defending it.

The suit of the National Car Brake Shoe Co., under the Bing & Wood shoe brake patents, against the Chicago & Alton Railroad Co., has been abandoned and dismissed by the plaintiffs.

The same is true of the suit of E. R. Bennett, under the Joseph Wood frog patent of 1863, against the Illinois Central Railroad Co.

The case of Huy, under his pile-driver patent of 1870 (reissue 1880), against the Mobile & Ohio Railroad Co., was tried before a jury and his Honor Judge Bruce in January last, and resulted in a mistrial, the jury being unable to agree. Upon the determination of this case, the railroad company, defendant, made a settlement with the patentee, it is presumed for a reasonable amount. We believe that the reissue of this patent is utterly invalid and void, and subject to nearly all the criticisms upon reissues which have recently been made by the courts. We are confident that this reissue would never be sustained by the Supreme Court, but, in addition, we have abundance of evidence, much of which was obtained since this suit was tried, that the same device was in use many years prior to the alleged invention of Huy.

Concerning the suits commenced during the year:

The case of the Detroit Lubricator Co. vs. the Lake Shore & Michigan Southern Railway Co. was commenced and dismissed at plaintiff's costs, the subject matter of which is referred to elsewhere in this report.

Suit has been commenced by Henry W. Hewet against the Chicago, Rock Island & Pacific Railway Co. for an alleged infringement of Letters Patent No. 81,167, granted to the said Hewet October 18, 1868, for an improvement in steam safety valves. The infringement is said to consist in the use of the Ashton blow-back valve, and the defense is that there is no infringement, the two devices being totally unlike.

Samuel H. Turrill commenced, during the year, a suit against the Chicago, Burlington & Quincy Railroad Co., alleging infringement of the Cawood swage block patent prior and subsequent to the period covered by the decree in his former suit against that company. A reasonable amount was offered in settlement of this case before the commencement of the suit, and an unreasonable, not to say preposterous, sum was demanded by the claimant, and refused by the company under our advice.

Two suits have been commenced by Samuel Love—one against the Illinois Central Railroad Co., and the other against the Chicago & Northwestern Railway Co.—under Letters Patent No. 61,548, granted Jan. 26, 1867, upon bumping posts, one of those roads having used bumping posts with a single sill, and the other with two or more sills. In answer to our circular letter of Sept. 27, we have received numerous, and, as we believe, perfectly reliable statements of the prior use of both forms of this bumping post. A stipulation has been made in this case, by the terms of which we are to now ascertain and preserve full data as to the present alleged liability of the membership, and we are to relieve the claimant, as far as possible, from all the trouble, delay and expense in this litigation consistent with a full adjudication by the courts of the issues involved; and, in case the court of last resort shall pronounce against us, then the Association is to advise the members to pay a sum equal to \$10 per post now so held to infringe this patent, and to use all efforts to collect the same from the members without delay or cost of collection to claimant, the members to receive for such payment per post now in use a full release for the past and a full license for the future, covering all additional equipment, without additional payment. The pendency of this suit, therefore, need not in any way debar the future use of the device shown in this patent, which, we repeat, we believe to be public property.

The Hektograph Manufacturing Co. of New York, commenced during the year a suit against one of the members of this Association for an alleged infringement by it of Letters Patent No. 236,362, granted June 1, 1880, to Kwaysser & Husak. The infringing article in this case was bought by the defendant in good faith in open market of a party professing to have a patent therefor, and also, as we suppose, in forgetfulness of our circular letter of June 20, 1880, recognizing the validity of said patent, a full release for all infringements prior thereto by members of this Association having been granted at that time. Upon an investigation of the case a settlement was at once made by the defendant.

The other suit commenced during the year was by George B. Snow et al. against the Lake Shore & Michigan Southern Railway Co. for an alleged infringement of Letters Patent No. 127,983, granted July 11, 1872, to the said Snow upon a steam bell ringer. It is denied that there is any infringement in this case, the device used by the defendant being materially different from that patented by Snow.

A list of suits still pending is given, which includes in the Supreme Court of the United States, suits under the Cawood Swage block patent, and a suit of the National Car Brake Shoe Co., and in the Circuit Courts under the Cawood and the Babes & Smith Swage block patents; the Herring wrecking car patent; the Hewet steam valve patent, the Love bumping post patent, and the Hodge brake patent. A suit under the Kirby feed-water heater patent has just been

decided in favor of the Association. The report continues:

A claim has been made against members of this Association for the use of a conductor's punch having a box on its under side for holding the punchings of tickets. The patent under which claim is made is for such a box having a lock and key, the key being retained by the ticket auditor, who opens the box and counts the punchings as a check upon the conductor. The punch alleged to have infringed has a box, without lock and key, to catch the clippings and prevent their being reinserted into commutation and other tickets. A claim is made for a royalty of 10 cents per day for the use of this punch. We are still investigating this matter, but now suggest whether the use of such a box on punches is of sufficient value to warrant its use upon the basis of the payment of any royalty therefor.

We have been requested during the year to give our consent to the use of brasses and metals, such as the "Damascus Bronze," which are secret compounds and not patented, the owners of which decline to give us their ingredients, even confidentially. Such compounds are the most difficult to protect from being illegally used by other manufacturers if publicly patented, and this may be the reason why they are not patented. Without specially referring to the peculiar metal above named, the circumstances attending some of these instances indicate that the real reasons for such secrecy are, first, that no valid patents could be obtained therefor, and second, if the compound or the process of its manufacture were made known, the manufacturer and the user would be subjected to suit. At least the railroad companies can well afford to let all things alone which require any such secrecy.

We have had several requests for the approval of the use of the power brake offered by the Salisbury Steam Brake Co., which raised questions of infringement of the patents owned by the Westinghouse Air Brake Co. Suit has been recently commenced by the latter company against the Salisbury Co. in the United States District Court for the Southern District of Illinois, and our present advice is that members shall postpone any desired use of the Salisbury brake until some results are arrived at in this litigation.

The expenditures of the year do not materially differ in character or amount from the expenditures of recent years. The amount of funds now in the treasury is the amount needed at the commencement of each year to defray the expenses of the time required to levy and collect the first installment of the assessment for the next year, which we recommend to be the same as the assessment for this year, to-wit, \$27,000.

We have re-rented the present office of the Association, at the present rental, for three years from April 30, 1888.

The Treasurer's statement is as follows:

Balance from 1881.....	\$6,149.73
Amount of assessment.....	\$27,048.16
Less unpaid (by Bur. & Ohio River Co.).....	\$60.75
Assessment and new members.....	26,987.41
Total.....	\$33,959.56
Authorized disbursements.....	28,061.50
Balance to 1883.....	\$5,898.06

Of this balance there is \$500 in the incidental fund and \$4,789.06 in the general fund.

An appendix to the report contains a list of the patents concerning which questions of validity or infringement have been presented and passed upon, and concerning which information can be given to members of the Association immediately upon receipt of requests therefor. The list includes patents upon every conceivable subject relating to railroads.

Another appendix gives a list of expired patents. The patents which expired during 1882 are those which were granted in 1865. Among those specially applicable to railroad devices we note the following: One of the Miller platform and coupler patents, and the patents upon what have become known as Wright's stop wedge; Goodale's brake; the Christy and the Sellers & Rhodes' brake shoes; Wharton's switch; the Dunbar, the Stevens, the Dutene and the Clark pistons and packings; Buerk's watchman's clock; Irwin's loose-globe lanterns; Fisher's refrigerator; Putnam's snow plow; Hughes & Jackman's process for tempering springs; Penketh's furnace for boilers; Warren's switch or replacer, and Kaylor's bolt machine.

The most important of these are the Miller coupler patents, of which there were three. The patent of 1863 expired in 1880. The second patent of Jan. 31, 1865, expired this year. It showed double beveled hooks disconnected from any coupling or bumper box. Its main features are: 1st, the slot at the head of the hooks to permit of coupling with other kinds of couplers, and 2d, preventing lateral thrust of cars by interlocking buffer heads. The third patent of July 24, 1866, will expire in July 1883, the only element of importance of which is spring buffers combined with coupling hooks in such a way that the spring buffers have to be forcibly compressed to allow the hooks to couple, thus, it is stated, keeping the faces of the hooks all the time in contact.

#### The Conditions Needed for Fast Trains.

A German journal, *Die Verkehrszeitung*, has recently published a tabular statement of the maximum speeds of trains in Great Britain, Europe and the United States. The table is inaccurate and incomplete to a very considerable degree, but it contains, nevertheless, some suggestive information. The *American Railroad Gazette* has supplemented it by a statement of the speeds of some of the fastest trains in the United States, and this statement has been in turn supplemented and corrected by two correspondents. The prominent fact which comes out is that the time taken to traverse any given distance between two places connected by rails shows that speeds are much slower than most people suppose. If we take, for instance, the run from London to Edinburgh, a distance of 397 miles via York, this is made in 9 hours by Great Northern trains, the average speed being thus 44.1 miles per hour. From Euston the distance is 401 miles, and London & Northwestern trains make the run in ten hours, or 40.1 miles an hour. By the Midland Railway the distance is 404 miles, and the time 10 hours 5 minutes, or very nearly the same speed. The German journal to which we have just alluded makes the distance 416 miles and the speed 41 miles per hour, which is an error. Some of the fastest trains in the world are those run between Leeds and London. From King's Cross the distance by the Great Northern is 196½ miles. From St. Pancras by the Midland it is 196 miles. The fastest train on the Great Northern makes the run in 4 hours 5 minutes, or an average speed of 45.4 miles an hour. The Midland trains traverse the distance in 4 hours 30 minutes, giving an average velocity of 43.5 miles an hour. The fastest train in the world is the Flying Dutchman, broad gauge, which makes the run to Swindon at 53½ miles an hour. The Great Northern trains run from London to York, 188 miles, at 48 miles an hour, and at least one train runs to Peterborough at 51 miles an hour.

The run from London to Grantham has been made repeatedly at 51 miles an hour. On the United States railways the quickest run appears to be that made between Jersey City and Philadelphia, 89 miles, made at the rate of

47½ miles an hour. There is not in the world a train timed to run at 60 miles an hour, although it is, of course, certain that that velocity is often exceeded. If a speed of 60 miles an hour could be maintained continually between London and Edinburgh, the journey would occupy only 6 hours 36 minutes; and allowing for three stops of 10 minutes each on the route, the time would be under 7½ hours, instead of 10 hours. So far as the machinery of a railway is concerned—by which we mean the road, the rolling stock, and the signals—there is nothing to prevent an average speed of 60 miles an hour being maintained. That it is not attained is certain. It is worth while to inquire why.

The first essential to great average speed is that the runs shall be long; that is to say, there must be long intervals between stopping places; and this is necessary, not so much because of the time lost in a station, as that spent in getting into and out of it. The station must be approached and left at a comparatively slow speed if for no other reason, then because it would be dangerous to do otherwise. The next essential is that the train shall be light, because the engine ought to be able to maintain a high speed when running up hill as well as when on a level. High speed trains cannot fully avail themselves of the compensating effects of inclines. Let us suppose that the maximum speed attained must not exceed 70 miles an hour. Then if the up and down inclines balance each other, the speed of the train must never fall below 50 miles an hour or else the average velocity cannot be 60 miles an hour. If the maximum speed permitted was 60 miles an hour, and the average speed 40 miles an hour, then trains might ascend the banks at 20 miles an hour, and still keep time. It would not be advisable to run at a higher speed under any circumstances with ordinary rolling stock than 70 miles an hour, and there are no locomotives built which would never run at less speed than 50 miles an hour between London and Edinburgh with a greater load than about 55 tons; that is to say, 75 tons for engine and tender, and 55 tons for four passenger coaches and a brake van, or in all 130 tons. The maximum number of passengers carried would be about 200, so that the dead weight moved would be about 13 cwt. per passenger. The first-class fare now is 57s. 6d. If we call it £3 we should have £800 as the total returns, or, say, 30s. per mile run. It is not at all impossible that such a train might be made to pay. No doubt there would be now and then a strong temptation to add another carriage, but to give way would be to ruin the whole scheme. Its success would depend entirely on keeping the load to be hauled so small that engines might be worked at a speed never under 50 miles an hour. Three engines would be employed on the run, each making a distance of about 135 miles, and we cannot see that any great difficulty would be encountered in doing this. It must not be forgotten, however, that although the load would be small the excessive speed would make large demands on fuel and water. It would not be safe to reckon on a less consumption of coal than 40 lbs. a mile, so that the tender would have to carry about 3 tons, and allowing that each pound of coal evaporated 10 lbs. of water, including waste, the tank must hold 5,400 gallons, or 24 tons of water. It would, however, be highly objectionable to attempt to carry such a load as this, and Ramsbottom's water troughs supply a way out of the difficulty and a tender capacity of 2,000 gallons would be ample. On a grate of 20 square feet the consumption would be at the rate of 120 lbs. an hour, which is much too fast for comfortable or regular working and a special design of engine would be absolutely indispensable, one with a very long grate being required to provide the requisite surface. It will be seen that the engine which could comply with the required conditions has yet to be designed. The fastest train in the kingdom is, as we have said, the Flying Dutchman and this is 7 ft. gauge. Many persons think that the utility of the wide gauge in this case is that it prevents risk of oversetting. This is an entire mistake. There is no speed, perhaps, at which a train can run which would entail the least risk of such an accident on a good road of 4 ft. 8½ in. width. The speed advantage conferred by the 7 ft. gauge is that it permits an enormous boiler—and particularly an enormous grate—to be used. The "Great Britain," for example, has nearly double the heating surface of powerful express engines on other lines, and there would be no difficulty in increasing its grate surface up to 85 square ft., if necessary. Engines of this class have 1,953 square ft. of heating surface and 21 square ft. of grate. The Flying Dutchman consists of engine and tender weighing 65 tons 13 cwt., one eight-wheeled van 16 tons, and five eight-wheeled coaches weighing 88 tons; total, 169 tons 18 cwt.

The principal reason why high speed trains are not run is that it is difficult to provide locomotives of sufficient steaming power. It is evident that if an engine could be produced which could do as much work with 20 lbs. of coal per mile as the existing engine does with 40 lbs., an enormous advantage would be gained; but it is not at all probable that any great saving can ever be effected in the consumption of coal. Mr. Webb's compound engine may do something, but the existing locomotive is bad to beat in this respect. The designing of a locomotive to make long runs at 60 miles an hour average speed presents, however, an interesting problem, which will, perhaps, be attacked some day. We have pointed out briefly a few of the more important conditions to be kept in mind. Locomotives are so absolutely interwoven in the dimensions of parts, if we may use the words, that to augment the area of a grate by one-half will suffice to almost revolutionize the proportions of an engine. That a good engine of this kind could be made we have, however, no doubt. It remains to be seen whether England or America will have one first. Every year the number of miles traveled by each member of the population increases, and this growth of travel will no doubt rapidly encourage the running of long distance express trains, by which alone can high mean speeds be attained or made to pay.—*The London Engineer*.

#### New Signals on the Boston & Albany.

The Boston Advertiser of Jan. 15 gives the following description of the new system of interlocking signals and switches just completed in the Boston & Albany yard in Boston:

Beginning yesterday the new system of interlocking switches and signals went into operation in the Boston & Albany yard in this city. For several weeks the buildings and mechanism have been in preparation, and a number of the most experienced and trustworthy switchmen in the employ of this company in the yard have been learning the principles and workings of the system, and yesterday the practical test given to it proved its utility and success in a most convincing manner. The system employed is not a new one to the Boston & Albany management; it has been in use at South Framingham for some months, and at tower No. 7, just above the Huntington avenue bridge, for a few weeks. It has also won the reputation of success in England, and wherever it has been tried in this country. It is, primarily, an English invention of interlocking switches and signals, with the addition of electrical locks, which are such a valuable adjunct, and which are of American origin. A few hundred feet south of the passenger station, on Kne land street, about midway between it and the narrow cut under Albany street, and right in the centre of the network of tracks converging there, stands a small two-story







meeting, relates only to the financial affairs of the company.

The general account, condensed, is as follows:

Stock	\$11,240,114.58
Bonds	5,399,343.63
Income account	656,666.43
Account and balance	237,232.43
<b>Total</b>	<b>\$17,539,357.07</b>

Road and property \$16,878,871.74  
Sinking fund account 145,808.10  
Materials account with lessee 261,210.66  
Accounts receivable 2,416.99  
Cash 251,046.58  
**Total** \$17,539,357.07

Stock includes \$14,300 old issues and \$10,714.58 scrip, not yet exchanged for guaranteed stock. The bonded debt consists of \$500 old second-mortgage and \$5,000 third-mortgage bonds; \$1,096,000 fourth-mortgage bonds and \$8,843.63 scrip; \$2,491,000 consolidated bonds, and \$1,798,000 construction and equipment bonds. During the year \$20,000 were retired by the sinking funds, and \$225,000 construction and equipment bonds issued to the lessee on account of betterments made in 1882.

The income account was as follows:

Received from lessee for rental	\$1,238,309.04
Interest on cash balances	1,263.68
<b>Total</b>	<b>\$1,239,572.72</b>

Interest	\$351,150.00
Dividends, 7 per cent.	786,908.00
Sinking funds	90,195.00
Maintenance of organization	9,572.74
<b>Total</b>	<b>1,237,825.74</b>

Balance	\$1,746.98
Add interest and dividends received	3,320.61
<b>Total balance</b>	<b>\$5,067.59</b>

The lessee expended \$225,058.08 in betterments of road and equipment. The wooden bridges are gradually being replaced by iron structures.

The report says: "During the year the final settlement has been made with the Pennsylvania Railroad Company in the matter of surplus assets remaining to this company as of the date of the lease after closing its business, which surplus accrued to the lessee by the terms of the supplementary agreement of Nov. 30, 1871. The total amount transferred as authorized by the board of directors is \$202,291.51.

"This sum has been charged against construction, meeting the old balance of net earnings, \$390,138.53, credited to construction in the year 1880.

"The laying of steel rail has progressed westward on the River Division from one mile east of Brilliant (late La-Grange station) to within about one mile of Bridgeport station, a distance of 16 miles."

#### Worcester & Nashua.

This company owns a line from Worcester, Mass., to Nashua, N. H., 46.09 miles, and it leases the Nashua & Rochester road, from Nashua to Rochester, 48.39 miles, making 94.48 miles worked. There are 16.83 miles of second track and 15.38 miles of sidings. Of the main track 34.75 miles are laid with steel. The report is for the year ending Sept. 30.

The equipment consists of 20 locomotives, 19 passenger, 3 parlor and 7 baggage and mail cars; 263 box, 125 flat and 100 coal cars; 1 derrick and 2 tool cars and 3 snow-plows.

The general account is as follows:

Stock	\$1,780,800.00
Bonds	982,000.00
Notes payable	85,000.00
Accounts and balances	27,802.29
Profit and loss	85,581.17
<b>Total</b>	<b>\$2,955,183.46</b>

Road and equipment	\$2,543,921.02
Nashua & Rochester Stock	280,080.00
Materials	48,007.68
Accounts and balances	22,022.18
Cash	46,192.58
<b>Total</b>	<b>\$2,955,183.46</b>

Of the bonds \$37,000 are due on demand; \$275,000 in 1887; \$250,000 in 1893, and \$400,000 are due in 1895; all bear 5 per cent. interest, the interest having been reduced by agreement some years ago. The rental of the Nashua & Rochester road is 5 per cent. on the bonds and 3 per cent. on the stock.

The traffic for the year was as follows:

Train miles	1881-82	1880-81	Inc. or Dec.	P. c.
Passenger	207,472	188,055	I.	10.3
Freight	237,272	250,855	D.	13.613
Service and switching	63,755	57,236	I.	6.529

<b>Total</b>	<b>508,499</b>	<b>496,106</b>	<b>I.</b>	<b>12.333</b>
Passengers carried	433,732	402,239	I.	31.493
Passenger miles	7,467,524	7,222,909	I.	24.535
Tons freight carried	541,036	514,236	I.	26.810
Ton-miles	16,949,008	16,153,062	I.	795.946

Av. train load:				
Passengers, No.	36	38	D.	2
Freight, tons	71	64	I.	7

There was a fair increase in traffic, more in local than in through business. The larger freight traffic was handled with a lighter train mileage than in the previous year.

The earnings of the year were as follows:

	1881-82	1880-81	Inc.	P. c.
Passenger Dep't	\$233,462	\$220,54	\$13,408	6.1
Freight Dep't	398,520	368,717	29,803	8.1
Rents, etc.	22,533	22,103	430	1.9

<b>Total</b>	<b>\$654,515</b>	<b>\$610,874</b>	<b>\$43,641</b>	<b>7.1</b>
Expenses	474,989	433,574	41,415	9.5

Net earnings	\$179,526	\$177,300	\$2,226	1.3
Gross earn. per mile	6.927	6.466	461	7.1
Net earn. per mile	1.900	1.877	23	1.3
Per cent. of expenses	72.57	70.97	1.60	

Expenses include taxes, which were \$15,918.98 last year. The increase in earnings was considerable, but was nearly equalled by that in expenses, which were due to larger renewals and increased prices paid for materials and labor.

The income account for the year was as follows:

Net earnings, as above	\$179,525.78
Interest paid	\$51,116.89
Rent of Nashua & Rochester R. R.	74,437.00
Dividends, 3 per cent.	53,694.00
<b>Total</b>	<b>179,247.89</b>

Surplus for the year \$277.89

Of the amount charged as rental the sum of \$14,352 is returned to the Worcester & Nashua Company as dividends upon the stocks of the leased line held by it. The earnings of the Nashua & Rochester road were about \$10,000 in excess of those of any previous year, but were not equal to the rental. It is hoped that in a few years the road will become self-sustaining.

During the year 4,986 ft. new sidings were built, the grade of the road improved at several points and Worcester engine-house enlarged. One locomotive, a derrick car and fifteen flat cars were added to equipment; another engine and several flat cars are in progress. There were 741 tons steel rails and 53,146 new ties used in renewals. A new yard has been made at Clinton and other improvements of minor importance.

#### Fitchburg.

This company worked the following lines during the year ending Sept. 30, 1882:

	Miles.
Main Line, Boston to Fitchburg, double track	53.68
Watertown Branch, Junction to Waltham	6.00
Lancaster & Sterling Branch, South Acton to Marlboro	12.42
Peterboro & Shirley Branch, Ayer Junction, Mass., to Mason Village, N. H.	23.62

<b>Total owned</b>	<b>95.72</b>
Vermont & Massachusetts, leased:	
Main Line, Fitchburg to Greenfield	56.00
Branch, Greenfield to Turner's Falls	2.80
<b>Total owned and leased</b>	<b>152.12</b>

The company also runs trains over the Troy & Greenfield Railroad, 37 miles, paying tolls to the state of Massachusetts for its use; this makes the main line 143.68 miles long, from Boston to North Adams. On the road owned there are 50.68 miles of second track and 64.69 miles of siding; on the road leased 28.54 miles second track and 30.98 miles of sidings. The use of 10.5 miles of track, from Fitchburg to South Ashburnham, is leased to the Cheshire Railroad. The total mileage of track on the lines worked is 326.96 miles. Additions during the year were 1.75 miles of sidings on the line owned, 6.48 miles of second track and 1.40 miles of sidings on the leased line.

The equipment consists of 98 engines and 100 tenders; 98 passenger and 99 mail and baggage cars; 2,241 box, 766 flat, 244 coal and other, and 28 caboose cars; 9 snow-plows. Additions during the year were 7 engines and tenders; 2 passenger and 2 baggage cars; 2 caboose and 47 coal and other cars.

The general balance sheet is as follows, condensed:

Stock	\$4,950,000.00
Funded debt	3,000,000.00
Notes payable	1,085,500.00
Interest, vouchers and accounts	140,799.81
Vt. & Massachusetts R. R.	778,617.96
Profit and loss	301,398.05
<b>Total</b>	<b>\$10,255,315.52</b>

Road and property	\$7,398,459.44
Vt. & Mass. improvements	1,546,960.68
Hoosac Tunnel Dock & Elevator Co.	374,000.00
Sinking fund	204,326.31
Materials	451,151.46
Balances	97,270.10
Cash	184,147.53
<b>Total</b>	<b>\$10,256,315.52</b>

There was an increase during the year of \$1,000,000 bonds and \$51,000 notes payable. The bonds are all plain bonds, due at various dates; the total yearly interest charge is \$152,500.

Cost of property increased \$321,894.17; improvements of Vermont & Massachusetts road, \$361,302.30, and investment in Hoosac Tunnel Dock & Elevator Co., \$93,500 during the year.

The traffic for the year was as follows:

Train-Miles	1881-82	1880-81	Inc. or Dec.	P. c.
Passenger	825,091	860,829	D.	35.738
Freight	841,842	957,422	D.	115.589
Switching and service	422,873	493,795	D.	70.922

<b>Total</b>	<b>2,089,806</b>	<b>2,312,046</b>	<b>D.</b>	<b>222,240</b>
Receipts per train mile	125 cts.	115 cts.	I.	10 cts.
Cost per train mile	117	108	I.	8.3

Passengers carried	2,950,423	2,627,984	I.	301.439
Passenger miles	47,628,311	42,854,047	I.	4,774.264
Tons freight carried	1,822,262	1,776,960	I.	45,302
Av. passenger train load	58	50	I.	8

Of the passenger-miles 24.9 per cent. were to and from other roads. The freight to and from other roads was 112,948,822 ton-miles; the total ton-miles are not given. There was a decrease of 36,357 tons in through freight carried, and an increase of 81,659 tons local freight.				
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Since the close of the year there has been a great improvement in freight tonnage and also in rates.

The earnings for the year were as follows:

	1881-82	1880-81	Inc. or Dec.	P. c.
Passengers	\$816,772	\$780,055	I.	\$36,717
Freight	1,521,576	1,658,139	D.	136,563
Mail and express	78,216	67,271	I.	10,945
Rents, etc.	197,166	150,365	I.	46,801

<b>Total</b>	<b>\$2,613,730</b>	<b>\$2,655,830</b>	<b>D.</b>	<b>\$42,100</b>
Expenses	2,007,886	2,127,438	D.	119,552

Net earnings	\$605,844	\$528,392	I.	\$77,452
Gross earn. per mile	17.182	17.459	D.	277
Net " " "	3.983	3.474	I.	509
Per cent. of exps.	76.82	89.10	D.	3.28

The loss in earnings was due to the diminished grain movement and to the low rates caused by the railroad war which prevailed during a large part of the year.

The report says: "The passengers carried over the Troy & Greenfield road increased from 119,526 in 1881 to 122,255 in 1882; and the tolls paid the commonwealth for passengers, expresses and mails increased from \$45,857.16 to \$47,868.48. The freight over the same road has decreased from 910,951 tons in 1881 to 893,712 tons in 1882, and the tolls paid thereon have decreased from \$140,835.84 to \$117,970.55. The total tolls paid the commonwealth on freight and passenger business have decreased from \$186,693.00 in 1881 to \$165,839.03 in 1882, or \$20,853.97.

"The above payments have been made in accordance with our contract with the state; but in February next they will be revised by the Railroad Commissioners acting as auditors, and permanently adjusted for the year."

The result of the year was as follows:

Net earnings as above	\$605,843.66
Rent of Vt. & Mass. R. R.	\$236,967.00
Other rents	2,005.00
Interest on bonds	152,500.00
Other interest	46,229.74
<b>Total</b>	<b>438,301.74</b>

Surplus for the year \$167,541.92

Dividends amounting to 6 per cent. on the stock (two of 3 per cent. each) were paid during the year.

The Hoosac Tunnel Dock & Elevator Co. has opened for business, but little return has been received from this investment, owing to scarcity of grain.

Improvements made during the year include 1.75 miles of new sidings on the line owned, and 13.59 miles of new tracks on the leased line. A new lumber shed has been built at Charlestown, the Miller's Creek bridge filled in and the work of filling in at the Miller's River yards continued. Additional tracks have been laid at the Boston & Lowell crossing. Two iron bridges have been substituted for wood, and four overhead bridges built for highway crossings, where grade crossings have been discontinued.

On the Vermont & Massachusetts road the second track has been extended to Baldwinville, 70.48 miles from Boston, the grade west of Baldwinville reduced from 45 to 31 ft. to the mile, and beyond that a new section of road 3.48 miles long has been nearly finished, which will shorten the distance about one-fourth of a mile and reduce the grade from 50 to 31 ft., besides avoiding 696 ft. of bridging and five highway grade crossings. Other work, in reducing grade, avoiding crossings and replacing wooden bridges, is in

progress. The change by which the New London Northern road is carried over this road, instead of crossing it at grade, has been finished.

There were used in renewals 1,987 tons steel rails, 67 tons iron rails and 110,001 new ties.

The expenditures for improvements and additions to property during the year were as follows:

Improvements, Fitchburg R. R.	\$111,995.38
Vermont & Mass.	361,372.39
Real estate bought	49,416.43
New equipment	160,182.36
Stock of Hoosac Tunnel Dock & Elevator Co.	93,500.00
<b>Total</b>	<b>\$776,396.56</b>

Since the Vermont & Massachusetts road was leased in 1874, the expenditures for improvements of road, additional tracks, terminal facilities, real estate and new equipment have been \$5,230,037, or very nearly \$35,000 per mile of road worked—enough to build a single-track road over the whole of the main line and branches. The full benefit of these expenditures cannot be realized until the work now in progress has been completed. In the time covered by these expenditures the road has been changed from a short line with a purely local business and equipment of the old style, to a line with a large through traffic, heavy modern equipment and extensive terminal facilities. The character of the road and its methods of doing business have been completely changed. The credit of the company and its profitable local business have carried through this period of transition, but its stockholders have to look forward for the full realization of their investments.

#### Pittsburgh & Lake Erie.

This company owns a line from Pittsburgh, Pa., to Youngstown, O., 68 miles, with a branch to New Castle, Pa., 2.35 miles, making 70.35 miles in all. The following statements are from the report for the year ending Dec. 31, as presented at the recent annual meeting.

The general account is as follows:

Stock	\$2,050,000.00
Dividend scrip	410,000.00
First-mortgage bonds	2,000,000.00
Real estate mortgages	195,843.12
Bills payable and temporary loans	368,823.06
Balance of accounts	64,598.00
Surplus not divided	548,368.78
<b>Total</b>	<b>\$5,637,530.96</b>

Construction of road	\$3,644,601.75
Real estate and right of way	869,997.63
Equipment	1,113,770.45
<b>Total cost of road</b>	<b>\$5,588,369.83</b>
Cash on hand	49,161.13
<b>Total</b>	<b>\$5,637,530.96</b>

The dividend scrip includes two dividends of 10 per cent. each, for 1880 and 1881, made to represent earnings used in construction; a third will be paid for 1882. The real estate mortgages will mature in 1887, 1888 and 1893. The bills payable given for equipment (included above) are \$68,488.72 due in 1883, \$31,568.32 in 1884, \$18,426.52 in 1885, being \$118,503.56 in all.

The car mileage for the year was as follows:

	1882	1881	Inc.	P. c.
Passenger-train cars	858,846	768,318	90,528	11.8
Freight cars, loaded	6,955,350	6,029,570	925,780	15.4
" " empty	3,300,984	2,444,537	856,447	35.0

<b>Total freight mileage</b>	<b>10,256,314</b>	<b>8,474,107</b>	<b>1,782,207</b>	<b>20.7</b>
Per cent. of loaded cars	67.8	71.2		

This statement indicates a very satisfactory increase of business. No further statements of traffic are given in that portion of the report published.

The earnings for the year were as follows:

	1882	1881	Inc. or Dec.	P. c.
Freight	\$1,023,332	\$832,023	I.	\$191,309
Passengers	217,737	181,565	I.	36,182
Mail, express, etc.	24,670	27,485	D.	2,816

<b>Total</b>	<b>\$1,265,748</b>	<b>\$1,041,063</b>	<b>I.</b>	<b>\$224,685</b>
Expenses	757,044	608,705	I.	148,279

Net earnings	\$508,704	\$432,358	I.	\$76,400
Gross earn. per mile	17.082	14.708	I.	3.194
Net " " "	7.331	6.145	I.	1.086
Per cent. of exps.	59.8	58.4	I.	1.4

The increase in earnings was large. The road, although comparatively new, has already earnings per mile which are positively large and compare well with many older lines.

The income account for the year was as follows:

Net earnings, as above	\$508,704.17
Interest on bonds	\$120,000.00
floating debt	44,032.80
<b>Total</b>	<b>164,032.80</b>

Surplus for the year	\$344,671.37
Miscellaneous receipts	35,969.50
<b>Total</b>	<b>\$380,640</b>



"Since the close of the fiscal year, a contract has been entered into with the Pennsylvania Railroad Co. for the use of the Allegheny Valley road from Falls Creek into Pittsburgh on a pro-rata basis. The terms of the agreement are, that we are to have as low rates from Pittsburgh to all points reached by our road or its connecting lines as the Pennsylvania or any other competing line makes between the same points. The terminal charges in Pittsburgh, on their part, and at Buffalo and Rochester, on our part, to be included in the pro-rata. In other words, no terminal charges are to be made by either party to the agreement. The contract can be terminated by either party giving to the other one year's written notice of their desire to do so. Whenever it is found advisable, we can extend our Punxsutawney line directly to the city of Pittsburgh, which will make a shorter line than via the Allegheny Valley Railroad."





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S. WRIGHT DUNNING AND M. N. FORNEY.

#### EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Addresses.**—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subject pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

#### MACHINE DESIGN.

Professor Reuleaux in his *Kinematics of Machinery* says that the science of machine design applies the results of research to the special problems with which it deals, and that when it solves these problems in accordance with technological requirements, it forms a *really technical science*. Reuleaux attempted to formulate this science into "a theory of machines," but it is doubtful whether his work has ever been of much assistance to those who are practically engaged in designing machinery.

If the exercise of knowledge which consists of either ultimate principles or facts as explained by principles is a science, then the term may be properly applied to machine design. It requires, though, not so much a knowledge of general principles as it does of the employment of means, the adaptation of methods which have been suggested by experience to accomplish some desired end, and in that sense it is an *art*. It is, perhaps, a matter of very little importance whether it is called a science or an art, inasmuch as it is certain that it requires a very definite knowledge of scientific principles; and if the work of the designer of a machine accomplishes its purpose fully and permanently with the least expenditure of means, then "it implies the possession of an unusual intensity of the modifying power" which Coleridge said was a characteristic of genius. Ability of this kind to be of a high order requires great quickness of apprehension both of principles and methods of construction of machinery, with a certain dexterity of thought or power of ready adaptation of the elements of machine construction to the ends to be accomplished. A person having such ability must also be able to compare ideas, to find their mutual relations, to reason correctly and ascertain the truth about them and to draw sound conclusions therefrom.

It is not easy to make any one who is not an expert realize the importance of the difference between well and badly designed machinery. To the person who has little discernment in such matters machines for like purposes appear to be very much alike; but as some one has said of people, although they are very much alike, yet their differences are of the utmost importance.

We have been led to write about this subject because there is good reason for believing that there is no kind of ability of more value in the operation of railroads, or which can do more to effect economical management, than a good knowledge of the science and art of machine design, and there is none which seems to be valued less. The misapprehension of persons of the commercial turn of mind of the nature of superior ability for designing machinery is also very curious. The absurd doctrine has in some cases been promulgated that thorough knowledge of the principles, practice and especially the details of machine construction has the effect of narrowing and prejudicing the mind with

reference to such matters, and that a certain measure of ignorance of the questions to be considered is essential for sound judgment and "broad views." A serious precept has in fact been made of the theory of Sidney Smith's joke, that to review a book a person should not read it, because to do so prejudices the mind of the reviewer. It is as though it should be said of a physician, who is familiar with the symptoms of disease and who has devoted much time to its diagnosis, that therefore his mind has been narrowed and he unfitted to be an adviser of those who are sick. Ignorance is apt to take broad views of subjects which it does not understand. A very amusing illustration of the distrust which a person who is ignorant of engineering matters sometimes feels regarding those who are experts was recently given by the Mayor of New York. In alluding to the construction of a new aqueduct in a message on the subject he said: "It would, in my opinion, be wise, before finally adopting any plan, to have the opinion of *business men* as well as *engineers*, concerning its practicability, the probable cost, and the time required for construction." The intimation here that engineers are not "*business men*" reveals very clearly the feeling that those who are familiar with the construction of such work, who have studied its principles, who know the literature thoroughly, and who by practical experience, thorough investigation and the devotion of a life-time to its pursuit have acquired that kind of knowledge, somehow must be unsafe advisers in conducting such a project. It is of course true that a man might spend a life-time as an engineer of water-works and still, from some mental or moral defect be an unsafe adviser, and that one who has conducted other affairs successfully might be more clear-headed, more prudent, more sound in his conclusions than the man with the training of an engineer. There is a different reason for the distrust which practical men of affairs so often feel for the opinions of experts. It is based on very much the same idea which was expressed by an engineer of the Hudson River Tunnel who testified that "a knowledge of mathematics dwarfed a man's mind." There are many men with a great deal of capacity for the management of commercial affairs, and who have immense skill in conducting transactions involving various kinds of barter, who have the same impression about a knowledge of the principles and details of mechanical construction. Such knowledge they believe "dwarfs a man's mind" and makes it unsafe to place the responsibility for such matters in his hands.

This misapprehension of the nature of mechanical ability is one of the curious manifestations of its unintelligibility to a class of minds which have had only a commercial training. Like most skeptics, too, people of this kind are subject to alternate occasions of credulity and disbelief. It is among that class that Keeley and the inventors of petroleum fuel burners find their victims, and it is they who will longest resist the use of an invention which has only sound reason and common sense to recommend it. The characteristic of mechanical ability which they seem to understand best is its conclusiveness; that is, that theories, knowledge, skill and experience of a person who has a high order of ability of this kind will give him a certain measure of infallibility, that it will enable him to anticipate in advance whether a given mechanism will be adequate for its purpose, or how much risk of failure there will be in adopting it. There is nothing mysterious in this. It is only the consequence of an exercise of the prescience of common sense, guided by a great accumulation of facts and observations. The design of a machine like a locomotive is a very complicated adaptation of means to ends. If all the reasons, causes and influences which must govern a man in designing such a machine were fully written out, it would make a very large book, or perhaps a number of them. It is appalling to think how much an untrained person would be obliged to learn in order to design such a structure if he were guided alone by what was taught him and not by some precedent. A good design of machinery adopts the precept of St. Paul: "Prove all things; hold fast that which is good." There is perhaps no other occupation in which this is more essential to success. The chances of failure of machinery are illimitable; success only comes when everything is right.

The trait which is very often mistaken for mechanical ability is a kind of imaginative fertility of combination of the elements of mechanism. This is very common among a class of so-called inventors. They will dream and speculate about a thousand devices for accomplishing a thousand different purposes, most or all of them not worth accomplishing, or capable of being done by simpler means. Their contrivances are lacking in logicalness, and are often without a distinct purpose. Interviews are very common, in railroad

and technical newspaper offices, with inventors who have spent much time and thought in contriving such mechanism.

Loose car wheels belong to this class. Nearly all good mechanics, who have studied this subject, have been convinced that car wheels fixed on their axles are in every way better than those which can revolve independently of each other. Notwithstanding this there is in the Patent Office a whole graveyard of such inventions, and their end is not yet. Cases innumerable of this kind could be cited. A recent one is, however, too good not to be recorded. A young man, with rather a confident manner, introduced himself in the *Railroad Gazette* office and requested a private interview. When that was granted he said that he had been studying the action of locomotives, and he had observed that during one-half of the revolution of the driving-wheels the pistons were pushing in the opposite direction to that in which the locomotive was running, which resulted in a great loss of power. He had therefore, he said, conceived the idea of placing the cylinders vertical instead of horizontal, in order to save the wasted power. The young man was fired out of the office with as much expedition as civility would admit of.

Some schemers have a kind of versatility and audacity which seems to be very fascinating to people who have had little or no other training than that acquired in business. A man like Keeley, for example, will make some audacious claim for an invention, and will then be ready with numberless contrivances, often changed and altered with the frequency of the rise and fall of the thermometer. The end to be accomplished by the invention is of course one which would be of great value. The dupes are deluded as to the adequacy of the means to be employed for the attainment of the end, by a kind of promiscuous versatility of mechanical resources which blinds the eyes and misleads the imaginations of those who are ignorant of mechanical means and methods.

There is another opposite error into which the commercial man is liable to fall. Some unfortunate experience, perhaps, makes him distrust inventors and inventions. He therefore falls to the other extreme, and concludes that the only safe reliance is dullness. He distrusts education, dislikes intelligence, and elevates mental inertia into a virtue. Stupidity he is apt to think safe, and the conservatism of ignorance he is not afraid of. Some master mechanics and master car-builders seem to have been selected on this theory.

But the purpose of this article is chiefly to point out that one of the essentials of mechanical ability, of the highest order, is logicalness, or, to coin another term out of a slang phrase, "*deadsureness*." Dullness and conservatism have a certain measure of the latter virtue in common with ability and experience of the highest order. But while conservatism in machine construction does not fall into palpable error, it also fails in accomplishing any high degree of success. Ability of the highest order in machine construction has first the knowledge and experience which makes it acquainted with the practice and precedents of engineers the world over. This implies a certain kind of avidity for knowledge from which pride of opinion and prejudice have been banished, and also that such a person should be, perhaps, not so much a diligent reader, as an explorer in the whole field of literature pertaining to his occupation. Next he must be thoroughly familiar with the means and methods of accomplishing what the machinery he has charge of must accomplish. He must know experimentally how machinery is made and how it works and *how it fails*. This implies thorough practical knowledge of the way machines are constructed. Mere manual skill is perhaps not important, but often the acquisition of such skill will impress the reasons for things in a way that nothing else would. It is, for example, perhaps not important in designing a locomotive boiler that the designer should be able to drive a rivet perfectly and not mark the plate under the rivet head, but if he has ever had occasion to inspect the inside of such a boiler, or assist in fixing the braces over the crown-plate, he will have learned the importance of allowing room enough for the workman as no other method could have taught him. The same thing is true of all shop details. It is as important that he should be thoroughly familiar with them as that a doctor should know the symptoms of disease—and of health.

A good machine constructor will also have a thorough knowledge of the working of machinery, as well as of the causes and kinds of failure. He ought to be a perpetual student of scrap-heaps, and put his knowledge to the test of observation in the repair shop. He must also have, what has already been referred to, an unerring capacity for reasoning about things. He



must be able to see the relation of mechanical means to ends and judge of the adequacy of the one for accomplishing the other. There must be a singleness of purpose, and a conclusiveness in the ends aimed at, so that the greatest advantage will be accomplished with the least means, and with the least or no risk of failure. A machine, even of a simple character, consists of a very large number of elements, causes and objects all correlated, in what to a novice seems a bewilderingly complicated way, for the accomplishment of some end.

Lastly, the machine designer must have "an unusual intensity of the modifying power." It is this, based upon the knowledge described, that is, an intimate acquaintance with the principles and details of construction, and the capacity to reason correctly and rapidly about them, which makes a good machine designer. It is not alone ingenuity. He must have that, but he must have more. If his ability is of a high order, he will be ingenious, it is true—brilliantly so, it may be—but all his qualifications will be subordinated to that which we have called "deadness." A machine designer, to have great ability, must be able to accomplish the most important ends with mechanical appliances, the least expenditure of means and with the minimum risk of failure.

Such ability only comes after long experience, training and hard study, combined with more or less natural aptitude for such work. The "intensity of the modifying power" is much increased by practice and experience. The habits of thought needed to give dexterity to a person with a natural aptitude for mechanical design are acquired slowly and laboriously, as a musician learns how to use an instrument or a phonographer to write short-hand. The difference between the trained and the untrained power to modify mechanical means for the accomplishment of a given purpose is as great as, or perhaps greater than, that between trained and untrained effort in any other occupation, profession, science or art; and the differences in the ends accomplished are equally as great. In point of fact it is this kind of ability that has made the modern advancement in material progress possible.

It is a little singular, then, that the art or science of machine design is not valued more highly than it is by railroad managers and owners in this country. With the exception of a very few companies, none of them seem to be at all concerned about having eminent ability of this kind, and there are comparatively few men being trained in that direction. In fact, the position of superintendent of machinery usually has so little salary and authority attached to it that young men of the best or good natural abilities can do better elsewhere. The consequence is that the management of that department on many roads seems to be gradually settling down into a state of more or less stagnation. Master mechanics and superintendents of machinery are often made subject to one or several grades of officers below the chief executive, who are completely ignorant of the principles or the practice of machine design. Ignorance of this science and art has in fact, in some cases, been made a condition for the exercise of authority. So long as such qualifications are exacted there is little prospect of improvement. There will be hope of it, though, so soon as railroad companies shall require that the officers who have authority over the construction and operation of its machinery shall be thoroughly trained in the science and art of machine design.

#### DECEMBER EARNINGS.

December earnings, so far reported (by 61 companies with about 47,800 miles of road, but not including several of the most important roads that report later, as the Atchinson, Topeka & Santa Fe, the Northern Central, the Pennsylvania and the Reading), show an increase of 6.3 per cent. in total earnings, but a decrease from \$500 to \$487 in average earnings per mile—2½ per cent. Of the 61 roads reporting, 17 report smaller total earnings, which is a larger number than heretofore for several months. It might naturally be supposed that December was an unfavorable month last year because of the railroad war and the light grain crops. This, however, was not the case. The 59 roads reporting in our table for December last year showed an increase of no less than 6.2 per cent. in their average earnings per mile over their earnings in 1880. The fact was that few of the roads much affected by the railroad war reported then, and the effect of the bad crops was not fully felt until later—until March, in fact; for the winter grain movement (except to the sea-board) was exceptionally heavy. Thus we find that in earnings per mile there was an increase in December, 1881, over the corresponding month in 1880 of 15 per cent. on the Burlington, Cedar Rapids & Northern, 12½ on the Centra

Iowa, 21½ on the Milwaukee & St. Paul, 18½ on the Chicago & Northwestern, 20½ on the St. Paul & Omaha, 13 on the Hannibal & St. Joseph, 8½ on the Illinois lines and 12½ on the Iowa lines of the Illinois Central, 29 on the Missouri Pacific, 18½ on the St. Louis & San Francisco, and even 2 per cent. on the Wabash, which suffered (taking the crop-year through) much more than most other roads reporting at once from the light crops and the railroad war.

If we compare the earnings per mile this year and last of the chief roads which report a decrease this year, we shall understand the position better. They were:

	1880.	1881.	1882.
Central Iowa.....	\$426	\$492	\$419
Central Pacific.....	733	802	602
Chicago & Northwestern.....	535	615	494
Chicago Mil. & St. Paul.....	370	451	441
Chi., St. Paul, Minn. & Om.....	332	439	328
Denver & Rio Grande.....	634	590	382
Ill. Cen., in Illinois.....	507	634	591
Ill. Cen., in Iowa.....	375	449	383
Wabash.....	388	396	379

Now, most of these roads, it is true, had larger earnings per mile in 1880 as well as in 1881 than in 1882, but all but two had a very larger increase in 1881 over 1880, and the decrease from 1880 to 1882 is much less than from 1881, while two of the roads had larger earnings per mile in 1882 than in the good year 1880. These are the roads showing the largest decrease from 1881, and illustrate the fact that December was a good month for many roads in that year, and not a bad one.

The following roads which showed an increase in total earnings in November last report a decrease in December:

	Increase in November.	Decrease in December.
Central Iowa.....	\$14,780	\$17,893
Chicago & East. Ill.....	24,535	17,331
Chicago & Northwestern.....	50,249	137,098
Chi., St. F., Minn. & Om.....	124,674	56,818
Ch. Ind., St. L. & Chi.....	8,718	5,833
Col. Hocking Val. & Tol.....	12,671	20,688
Green Bay, Winona & St. P.....	2,603	6,049
Ill. Cen., in Illinois.....	6,879	39,903
Ill. Cen., in Iowa.....	8,047	26,431
Ohio Central.....	21,528	13,421
Belleville Line.....	8,121	162

The opening of new lines at different times may suddenly change the earnings so as to convert what for months has been an increase in earnings to a decrease, without any change in the condition and course of traffic. If a new line were opened Dec. 1, and contributed afterwards \$100,000 a month to earnings, comparisons with months previous to its opening might show a large increase, and afterwards, without change of earnings, a large decrease, and the comparisons of many roads are now complicated from time to time for this reason—the thing compared with varied considerably from month to month.

It will be noticed that some of the roads which had smaller total earnings last December had a larger mileage. This is, perhaps, more likely to be the case in winter than at other seasons of the year. New roads opened just as winter sets in are likely to have very little to do until the next season, and this is especially true of roads in new countries. In the case of the Central Pacific, the company is now working a considerable mileage in Texas which can have scarcely any traffic until the connection to San Antonio is completed.

In December fell most of the losses of the St. Paul railroad war, which had something to do with the decrease in earnings on the Northwestern and the St. Paul & Omaha roads. The effect is seen on the Milwaukee & St. Paul in the fact that its increase in earnings was but \$109,731 in December, against \$502,403 in November—not that the difference was entirely due to the railroad war. It was largely due to the fact that this company in 1881 worked more road and had much larger earnings in December than in November, which is contrary to the usual course of things. Take the Northwestern and the St. Paul in the two months and we shall see:

	1882.	1881.	Inc. or Dec.
St. Paul.....	Nov. \$2,072,000	\$1,569,597	I. \$502,403
	Dec. 1,964,000	1,854,299	I. 109,731
Northwestern.....	Nov. 2,069,287	2,019,038	I. 50,249
	Dec. 1,718,379	1,855,477	D. 137,098

Last year we see that the St. Paul's earnings were \$285,000 more in December than in November; this year they were \$108,000 less, and the earnings are usually less in December than in November. The Northwestern last year had a decrease of \$164,000 from November to December; this year, a decrease of \$841,000. We should say that there would have been in any event a decrease from November to December, but that it was made much larger by reason of the railroad war.

The December grain movement was much heavier in the Northwest in 1882 than in 1881—20,900,000 bushels against 16,200,000 being received at the eight reporting Northwestern markets. But it will be a mistake to suppose that this should be felt by all the Northwestern roads. The fact is that an unusually large proportion of the receipts in December were corn, and that nearly all this came from country south

and southwest of Chicago, where alone it was fit to ship, and that a very large part of the wheat arriving then was winter wheat, coming from the territory a far south as the south line of Iowa (and from country east of Illinois). From Iowa, Northern Illinois and the country further north the grain shipments were light, and the only very active traffic was in flour. The roads carrying from this district did not have a very heavy traffic, but many of those south of them did. And the reports of earnings show that almost without exception the lines northwest of Chicago had either a decrease in earnings or a small increase. But few of the roads southwest of Chicago report, but these generally, with the important exception of the Illinois Central, show a considerable increase in earnings.

Southwest of St. Louis the reports are most favorable. The Missouri Pacific gains 22 per cent., the Central Branch 40 per cent., the Missouri, Kansas & Texas 36 per cent., the St. Louis and San Francisco 18 per cent., the Iron Mountain 10 per cent., the two little Arkansas roads 27 and 37 per cent., the International & Great Northern 23 per cent., the Texas Pacific 60 per cent., the Gulf, Colorado & Santa Fe 72 per cent., The Fort Scott & Gulf may be considered an exception in that its increase in earnings is small and hardly in proportion to its increase in mileage. Nearly all the other roads named have an increase in mileage, which is very large in some cases, but comparatively a small part of their increase in earnings is due to this. The country on their lines is full of grain and cotton, and prosperous, probably, as never before. It should be said, however, that though the crops in this country in 1881 were worse, perhaps, than any where else in the Union, the railroads did not show it much until later. Most of the lines named had larger earnings per mile in December in 1881 than in 1880, and their earnings last December were much larger than ever before.

The Southern roads east of the Mississippi also show great improvement. A large number report, and they should represent very well the average condition of railroad business in that part of the country. The increase in their aggregate earnings is 10 per cent., though only one has any increase in mileage. The Norfolk & Western gained 5½ per cent., the East Tennessee 10 per cent., the Louisville & Nashville 6 per cent., the Mobile & Ohio 19 per cent. Crops were so uniformly good in the South, and that part of the country is so exclusively agricultural, that anything but a good traffic at this time would be surprising.

The only roads east of Ohio that have reported as yet are the Eastern and the Long Island, and it will hardly be prudent to take them as illustrating the general course of railroad business in the East. The Eastern gained but 0.4 per cent., the Long Island 14½ per cent. It is unofficially reported that the New York Central gained \$500,000 in the month, which was about 20 per cent.; and the course of business and rates makes this entirely probable. But last year it was carrying its through business in both directions, passengers and freight, at such ridiculously low rates as to make its earnings exceptionally small all through the fall and winter months. We understand that in December and also in the three months ending with December this road's earnings were not only much larger than in 1881, but also a little larger than in 1880, and larger than ever before. We are informed that instead of an increase of \$1,200,000 in gross earnings in the last quarter of 1882, according to the statement made with the annual report, when the December receipts were estimated, the actual increase was just about \$1,500,000. The figures, however, have not been made public. In all probability, however, the trunk lines had a great increase in earnings in December.

The lines showing the least improvement seem to be those reporting (not trunk lines) between Pennsylvania and Illinois. As for the trunk lines east of Chicago, if we may judge by the Chicago & Grand Trunk, they have gained immensely, as its increase is not less than 64 per cent. But the lines in Ohio, Indiana and in Illinois east of the Chicago & Alton Railroad seem not to have fared very well. There are 14 of these roads reporting, mostly small ones; their mileage increased from 4,363 to 4,651 miles (6½ per cent.), but their aggregate earnings decreased from \$1,900,279 to \$1,838,161 (3½ per cent.), and their average earnings per mile were but \$395 in 1882, against \$435 in 1881. The most important roads of this district intermediate between the East and the West are not in the list—such roads as the Lake Shore, the Fort Wayne, the Pan-handle, the New York, Pennsylvania & Ohio, the Cleveland, Columbus, Cincinnati & Indianapolis, and the Baltimore & Ohio's trans-Ohio lines. Possibly in the southern part of this district traffic has not been good—though the corn movement should have made it good—but the through traffic on the northern lines, as



we know from the Chicago shipments, was unusually good.

We may sum up by saying that the reports so far received indicate good business everywhere in the South and Southwest; and in the West west of St. Louis and southwest of Chicago, and in Michigan; in different business northwest of Chicago, and poor business north of the Ohio. As to the country further East there are not enough of them to indicate anything.

#### The Massachusetts Railroads.

The Massachusetts Railroad Commissioners' Report for the year ending with September last has just been issued; and just here we take the opportunity to call attention to the fact that the New York Railroad Report for the year ending with September, 1881, has not yet made its appearance; and to suggest to the new Railroad Commission that the early publication of their report is one of the many practices of the Massachusetts Commission that deserves imitation. The Massachusetts report shows an increase of less than one per cent. (24 miles) in the railroad mileage of the state. The traffic of the Massachusetts roads was less affected than that of most other railroads of the country by the light crops of 1881. Their passenger traffic was doubtless very considerably increased by the low rates of the trunk-line railroad war, though there were other causes which tended to make it large. It was in fact 13 per cent. more than the year before and 26 per cent. more than in 1880. This growth of passenger traffic has been the notable feature in the business of the Massachusetts railroads since 1879. It grew smaller and smaller from 1874 to 1878, when it was 593 millions of passenger miles. There was then an increase of 24 millions (4 per cent.) in 1879, of 92 millions (15 per cent.) in 1880, of 80 millions (11½ per cent.) in 1881, and now of 104 millions (13 per cent.) in 1882, when there were 892 millions of passenger miles, which is a little more than twice the New York Central's passenger traffic in the same year. In freight traffic the increase last year was the smallest since 1878 and amounted to only 49 millions of ton miles, or 4½ per cent. The tonnage mileage was something less than one-half the New York Central's. We may gather from this that the passenger traffic plays a much more important part on the Massachusetts roads than on most others in this country. The New York Central is a great passenger road, but its tonnage mileage is nearly six times as great as its passenger mileage. The passenger mileage of the Massachusetts road is but one-fifth less than their tonnage mileage. Comparing directly, we find 406,000 ton miles and 321,000 passenger miles per mile of road on the Massachusetts roads, and 432,000 passenger miles and 2,394,000 ton miles on the New York Central.

Prosperity in manufacturing industries is reflected by the very heavy passenger traffic in Massachusetts of late years.

The average rate per passenger mile was just 2 cents last year, and lower than ever before. It is not the roads with the largest through travel that have the lowest average rates in Massachusetts. The Boston & Albany last year was nearly up to the average with 1.99 cents. per mile; but the Boston & Lowell's average fare was 1.67 cents, the Fitchburg's 1.71, the New York, New Haven & Hartford's 1.81 cents. Many of the Massachusetts roads have a great amount of travel on commutation tickets, and this brings down the average rate greatly. It is less probably than in any other state.

The average freight rate, on the other hand, is unusually high in Massachusetts, due to the fact that its freight traffic to an unusual extent consists of local traffic and short hauls, and also of valuable goods. There is no such great mass of coarse freight hauled long distances as the grain and provisions brought to New York, or the produce brought to Chicago and the lumber shipped thence. The through freight as classified by the Commission does indeed earn nearly half of the total freight earnings, but this, we believe, includes all freight interchanged between two roads, a very large part of which is purely local freight. The average rate per ton per mile was 2.17 cent last year, against 2.21 in 1881 and 2.50 in 1880. The average in New York in 1880 (it must be remembered that we have not the report for 1881 yet, not to say 1882) was 0.92 cent. The chief part of the difference is doubtless due to the immense through traffic in New York, and to local traffic carried in competition with the canal.

There was an increase of earnings from both passengers and freight—12 per cent. in passenger and 5 per cent. in freight earnings. Of the increase in passenger earnings, 70 per cent. was from local passengers, and of the increase in freight earnings 94 per cent. was from local freight.

The gross income from all sources and the expenses including rents were:

	1881-82.	1880-81.	Increase.	P. c.
Receipts.....	\$40,845,370	\$37,704,396	\$3,081,974	8.1
Expenses and rents...	29,844,167	27,062,644	2,881,523	10.6
Balance.....	\$10,902,203	\$10,701,752	\$200,451	1.9

With so large an increase in traffic it was to be expected that expenses would increase, but it seems that they increased so much that in spite of an increase of \$3,000,000 and more in earnings the companies had but \$200,000 more profit. The year before also there was a great increase in expenses, and it was then \$490,000 more than the increase in earnings. In the two years since 1880 the Massachusetts railroads have increased their earnings \$5,700,000, or 16 per cent., but their profits notwithstanding have fallen off

\$290,000. In these two years their funded debt has increased \$12,740,000 and their capital stock \$4,240,000. The income on the investment in the roads was last year the smallest since 1878. The net income has been the following percentage of the total investment for ten successive years:

Year.	Per cent.	Year.	Per cent.
1873.....	6.0	1878.....	5.4
1874.....	6.2	1879.....	5.8
1875.....	5.4	1880.....	6.2
1876.....	5.6	1881.....	5.8
1877.....	5.5	1882.....	5.5

It seems then that the Massachusetts railroads have had a very satisfactory growth of traffic of late years, and also a large increase in earnings, rates having fallen somewhat but not largely, but that they have been unable to keep up the interest formerly earned on the money invested in them because of rapidly growing expenses. From 1879 to 1882 was a period of very great activity and prosperity in Massachusetts, and the railroads reflect it by an increase of 45 per cent. in passenger traffic, of 40 per cent. in freight traffic, and of 35 per cent. in gross income; but not by their net income, which has increased but 7½ per cent. Or, briefly, in these three years the railroads gained no less than \$10,500,000 in gross revenue, but only \$750,000 in net income. The great prosperity of the state and the country seems to have been of no use to them.

The Massachusetts roads, however, are on the average more prosperous than those of most other states, or of the country as a whole.

#### Foreign Railroad Notes.

The Hungarian government railroad inspection has given notice to the railroad companies that in consequence of the delay in a gateman to close a road crossing a carriage had come near being run over by a train, which was, however, stopped in time to avoid accident. The gateman was arrested and tried for his neglect, and punished by two months' imprisonment and discharge from the service. The inspection requests the railroad companies to give notice of this punishment to all their watchmen as a warning.

The Belgian *Moniteur Industriel* has a long contributed article advocating the use of paper car wheels, which it says were first introduced into Europe by Mr. Finkbein on the Saarbruck Railroad, who had them made in Germany about a year ago, since which time they have been adopted by the Berlin & Anhalt Railroad, which has modified the form somewhat, and has them manufactured at Krupp's steel works. This writer thinks these wheels will be particularly valuable on roads with iron ties, of which there are now in Germany about 1,180 miles.

The Prussian Military Railroad, extending from Berlin to some artillery practice grounds, 28½ miles, and worked by the Army Railroad Corps, naturally is not a very profitable enterprise. In its last fiscal year it carried 73,564 passengers, of whom 60,868 were soldiers carried free of charge; and 48,197 tons of freight, 26,587 tons of which was for the service and did not pay. Its gross earnings were \$1,818 for passengers, \$4,634 from freight, and \$55,773 from "other sources"—altogether about \$2,130 per mile of road. The working expenses were \$57,018, and \$1,955 per mile; so that in spite of its doing most of its work without pay there was a balance of \$175 net earnings per mile.

The German Railroad Union has had to modify somewhat its regulations by reason of the great weight of the enlarged Prussian state railroad system. There was a conference last November at which modifications of the regulations governing passenger traffic were made. Concerning children it was determined that those under four years of age should be carried free if a seat is not required for them, that from 4 to 10 years children shall be carried at reduced fares, but the reduction is not fixed for all the roads in the Union except that two children under 10 will be carried on one full ticket. Full rates will be charged for children of 10 and over. These regulations are to be applied to round-trip, tourist and coupon-book tickets.

A German journal, devoted to "mechanics, optics and electro-technics," says: There are now in Europe the following electrical railroads: Berlin & Lichterfeld, 1½ miles; Charlottenburg & Spandau, 1.4 miles (closed now for repairs); Landvoort & Kostverloren (in Holland), 1½ miles; Bush to Bushhaven (north of Ireland), 6½ miles; at the Royal Coal mines, near Zankerode, in Saxony, 0.4 miles. The latter is in a coal mine, some 600 ft. under ground. The locomotive is but 32 in. wide, and weighs 3,300 lbs. It hauls 10 cars, carrying 8 tons of coal, each at a speed of about 10 ft. per second (less than seven miles an hour). This engine is worked from 4 in the morning till 11 at night and is said to give excellent satisfaction. The same journal gives a list of the electric railroads now under construction, or to be constructed, in which very little trust can be placed, as it evidently includes some lines which have simply been proposed. It gives one a mile and more long in St. Louis, and one out of New York, 50 miles long.

The Austro-Hungarian railroads are united in an association which meets out of a common fund the payments for persons killed and injured by accident. The assessments for this purpose are in proportion to passenger mileage and passenger car mileage. By this arrangement no company suffers an immense loss in any one year, which in the case of the small railroads might take all their net earnings, or more. A single accident in this country has cost more than \$600,000. If it had happened on a road ten or twenty miles long, it might easily have bankrupted it. Indeed, we

believe the Staten Island Railroad was bankrupted by the explosion of the Westfield, some years ago. But there is the great objection to such a mutual insurance association that the careful companies which provide themselves with all the safety appliances suffer as much as the most careless, and the very great effect of the costliness of accidents in causing efforts to avoid them is almost lost. Such an association should at least have rigid rules against accepting bad risks, and maintain a rigid inspection of the management as well as the condition of the railroads which it accepts as members. In a country where construction and management are largely prescribed by law, and are to some extent uniform, there might be little objection to such an organization; but in this country the differences are so great that we could hardly expect the best managed and equipped roads to share equally the risks on the worst lines, and if they did it would probably be an obstacle to further improvement.

The Austrian Minister of Trade has had prepared by the Government Sanitary Council a body of regulations for life saving on railroads, and a guide to first help to the injured by railroad accidents before the arrival of a physician, and has sent them to the several railroad companies for examination and suggestions. It is provided in the first document that every conductor shall be provided with a leather case of bandages; that there shall be a litter at every station and half-way between such stations as are more than nine miles apart; that at every station shall be kept a small case of surgical instruments, of specified kinds; that a larger supply of instruments and bandages shall be kept at stations 50 to 100 miles apart, where there are reserve locomotives, which locomotives are to pick up the cars and litters on the way to an accident. Still more complete provision is to be made at important stations where there are many employés. For every 250 or 300 miles of road, at an engine-house, there must be an hospital car, of a specified pattern (used for carrying sick and wounded in time of war). A new bell signal is prescribed, by which an accident, in which any person is injured, will be signalled from the nearest watchman's box (which are not very far apart on the Continental roads) to the next station, giving also the number injured.

The guide to first aid to the injured prescribes how the employés or others shall carry the victims of accidents, how place them, treat their wounds, apply bandages, transport them in the cars, and what to do in case of sudden illness, etc. The regulations would seem as if calculated for an army in the field, and for a country hardly inhabited and without physicians. There is, however, good reason why every man should know what to do with the victims of accidents, as half a minute may make the difference between life and death; and if other men, then railroad men much more, especially trainmen, track men and station men.

There will be in the winter semester of the universities of Berlin, Breslau and Berlin courses of lectures on the principal branches of railroading, the scope of which is summarized as follows in the *Archiv für Eisenbahnwesen*, a periodical issued by the Prussian Ministry of Public Works:

1. The theory of railroad operation, that is the theory of the rules and regulations according to which the working of a railroad is effected. In this course comes the description rolling stock, and the parts thereof, as axles, wheels, springs, draw gears, buffers, brakes, etc. Also the construction of road and its appliances, and the other fixtures required. With regard to the operation of railroads, the lectures are to cover the train and station service, how trains are made up in compliance with the road and operating regulations of the German Empire, and the methods of switching, the principles which govern the making of time tables, signalling and signal apparatus and the duties of the different classes of train-men, track men, etc.

Another course of lectures is devoted to the science of railroad administration—that is, instruction in the rules and regulations for the management of railroads. This includes the whole of the arrangements for the economic and financial utilization of the railroads, the organization of the departments, their functions, and all the apparatus by which they fulfill their object. In this course are treated such subjects as the development of traffic, the fixing of rates and fares, the selection of employés, and the means of training them, fixing wages, etc. Here to are treated the purchase, inspection, keeping and giving out of stores; also railroad statistics, the receiving, shipping and delivery of freight.

The third course is to be on railroad law.

The fourth course has for its subject railroad transportation in its relations to the community, considered as a branch of political economy.

The opening of the railroads from Tiflis to the Caspian Sea at Baku was announced by the Russian Government to take place on the 1st of January last. This road, which is 346 miles long, completes a line from the Black to the Caspian Sea parallel with and in the valley just south of the Caucasus and almost within sight of Mount Ararat, and along the river of Cyrus. From the Black sea at Poti to Tiflis, about 180 miles, the road has been open about 12 years, and was a most important means of communication during the late war with Turkey. For this country the road may have greater importance than other Russian roads from the fact that the terminus on the Caspian is in the Russian petroleum district, to which it will give an outlet. The distance to the Black Sea is but little further than from our oil regions to New York; and vessels loading at Poti can carry to all European ports, and to Mediterranean ports the distance is much less than from this country. If the



Russian petroleum was as good as ours and as cheaply obtained and refined, we should expect a sharp competition at once. It is, however, a heavier oil, apparently more like our West Virginia oil, and yields a smaller proportion of illuminating oil. It is, however, said to be exceptionally good for lubrication, and as such already to compete with American oil throughout Europe. Heretofore it has been shipped across the Caspian and up the Volga to a railroad, and carried thence a great distance by rail. This route is favorable for supplying a great part of Russia, but to Western Europe is very costly.

News from Vienna sent to a Berlin paper in the last week of last year says that the leading Russian petroleum producing company was then making great efforts to secure favorable arrangements with the railroads in Austria for carrying its oil to Western Europe. It was then negotiating with the roads between Warsaw and Vienna for carrying the oil in tank cars, and the writer says that the Russian petroleum has already driven the American almost entirely out of St. Petersburg, Reval and Riga (all Baltic ports) and Warsaw, as well as Northern and Southwestern Russia.

The new railroad, might, it would seem, become a favorite route for tourists who wish to get out of the beaten track and see strange peoples and places, and approach the cradle of European nations, without great expenditure of time or money. The railroad has as yet no railroad connections, but Poti should be easily accessible by steamboat from Constantinople or Russian Black Sea ports, and doubtless will be if anyone wants to go there. It is about 700 miles from Constantinople or Odessa.

#### Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

*Georgia Pacific*.—Extended from Millport, Ala., eastward 15 miles.

*Kansas City, Springfield & Memphis*.—Extended southwest to West Plains, Mo., 42 miles.

*Minnesota Central*.—Extended east to Red Wing, Minn., 10 miles.

*Nitchez, Red River & Texas*.—Extended from Lake Cordonia, La., west 2 miles.

*Oregon & California*.—Completed to a point fifty-four miles south of Roseburg, Or., an extension of 13 miles.

*Toledo, Cincinnati & St. Louis*.—The *Southeastern Division* is extended southward to Centre, O., 2½ miles.

*Toledo & Indianapolis*.—Extended south to Findlay, O., 33 miles.

This is a total of 136½ miles, making 10,465 miles so far reported for 1882.

New track is reported laid in the present year as follows:

*Galveston, Harrisburg & San Antonio*.—Completed by laying 10 miles of track near Pecos Crossing, Texas.

*Georgia Pacific*.—Track laid to a point fourteen miles east from Anniston, Ala., an extension (this year) of 4 miles; also extended east to Fayette Court House, Ala., 5 miles.

*Cincinnati & Eastern*.—Extended from Peebles, O., east to Plum Run, 2½ miles.

This is a total of 21½ miles, making 23½ miles thus far reported for 1883, against 8 miles reported at the corresponding time in 1882, and 25 miles in 1881.

CHICAGO RAIL SHIPMENTS EASTWARD for the week ending Jan 7 for four successive years have been:

Tons	1880.	1881.	1882.	1883.
.....	40,238	67,426	55,189	55,000

The shipments this year were thus 19½ per cent. more than last year, 2½ per cent. less than in 1881, and 64 per cent. more than in 1880. The shipments of this week were the largest of the whole winter in 1880.

Of the shipments of this week this year 9.6 per cent. went by the Chicago & Grand Trunk 32.1 by the Michigan Central, 20.1 by the Lake Shore; 1.6 by the Fort Wayne; 10.4 by the Pan-handle, and 11.8 by the Baltimore & Ohio. The two Vanderbilt roads thus had 52.2 per cent. of the whole, against the 45½ to which they are entitled in the pool, and the two Pennsylvania roads had 26.4, against 35½ in the pools. These roads are rapidly working off their "over" and "short" accounts.

For seven successive weeks the Chicago shipments have been, in tons:

Nov. 21.	Nov. 30.	Dec. 7.	Dec. 14.	Dec. 21.	Dec. 30.	Jan. 7.
50,401	57,206	23,576	49,335	60,294	73,330	65,900

With the exception of the last week of December, the shipments last week were the largest since the second week of February. For the next four weeks, however, the comparisons will be with a period when the shipments last year were the largest ever made—from 70,000 to 80,000 tons every week, carried at rates which must have caused a loss to the railroads. The earnings from the shipments this year in the first week of January must have been about at the rate of \$287 for every \$100 last year, every \$342 in 1881 and \$233 in 1880.

For the week ending Jan. 13 the shipments billed at Chicago (not including those billed from points west passing through Chicago) were 67,544 tons this year, against 55,986 tons in the corresponding week of this year, and 58,719 tons in the previous week of this year. The shipments last week were, we believe, the largest ever billed in one week at Chicago, but the total shipments may not have been large in proportion. The total shipments last year were 14,738 tons more than those billed at Chicago; and if they exceeded them by the same amount this year, then they were about 82,300 tons. The largest heretofore have been 80,525 tons in the week ending Jan. 28, 1882; 81,660 in the week ending June 25, 1881 (the

first week of the railroad war), and 87,690 in the week to March 27, 1880. It now seems possible that the shipments will be as large this January as last year, when they were larger than in any other month in the history of the traffic.

Last year, however, the heavy traffic was carried entirely without profit; this year the receipt per ton shipped is perhaps three times as great.

While the total increase in total shipments over last year was 11,558 tons, there was a decrease of 1,830 tons in provisions, an increase of 8,326 in grain, and an increase of 5,062 tons in flour. This year 60 per cent. of the shipments was grain and 20 per cent. flour; last year 58½ per cent. was grain and 15½ flour. The two Vanderbilt roads last week carried 51½ per cent. of flour and 56 per cent. of the grain, but only 37 per cent. of the provisions; the two Pennsylvania roads, on the other hand, carried 40 per cent. of the provisions and 40½ of the flour, but less than 17 per cent. of the grain.

THE NEW YORK RAILROAD COMMISSIONERS appointed by the Governor all have to prove their capacity for their positions; though, as they could not have had experience in the work of the office, perhaps that was to be expected. None of them is known as a student of the public side of railroad affairs. The nomination of Mr. O'Donnell was made for the Governor by the terms of the law. The experienced railroad man is Mr. Wm. E. Rogers, whose experience is exclusively in the location of railroads, we believe, his last and most important work being the location of the New York, Lackawanna & Western Railroad. He is a West Point graduate, and formerly an officer of the Corps of Engineers, which are pretty good certificates of intelligence, capacity and integrity. He is not known in politics, but is a son-in-law of Hon. Hamilton Fish, late Secretary of State.

The Democratic member of the Commission is a son of ex-Senator Kernan, and, though a young man, is regarded where he is known as a lawyer of excellent ability; and a lawyer of ability—and preferably a young man with a reputation to make—is needed on such a board.

It is, however, a misfortune that the Commission should not have a member familiar with traffic, rates and rate-making. If it is like other railroad commissions, the most of the work which comes before it in which the public will take an active interest will involve these questions, and the board is likely at any time to be sitting as a court to give judgments in cases the laws of which are unknown to its members as to nearly every one else in the community except a very small class of railroad men. To the study of these questions and of the laws governing them we may expect them to devote themselves faithfully. The powers of the board are chiefly confined to investigating and recommending, but these have been shown to be very effective when wielded by men capable of forming judgments on the questions investigated, and explaining them intelligibly to the public. When such a body deliberately says and clearly shows that a policy complained of is unjust or unreasonable, scarcely any railroad management will dare to persist in it; it may not be convinced, and it may care little for the Commission as such, and have no regard for the rights of the community; but it will have much regard for the power of the community, and a wholesome fear that it will be exercised when its duly appointed agents, of approved capacity and integrity, after full investigation, report that a serious evil needs to be remedied. Of course, if the Commission does not make a reputation for thorough knowledge of the questions which it discusses and judicial fairness, its recommendations will not carry much weight; but then they ought not to. It is likely to be fully as influential as it deserves to be, and rather more so. That is, the public will not be able to judge very well of the intelligence of the Commission's judgments and recommendations, but will be strongly inclined to adopt and enforce them if the members evidently aim at doing justice.

#### NEW PUBLICATIONS.

*Report of Proceedings of the Fifteenth Annual Convention of the American Railway Master Mechanics' Association.*—The report of the last year's convention has just been received. It contains reports of committees on boiler construction, Experiments with a Wootton Fire-box, a paper on the Joy Valve Gear and Webb's Compound Locomotive by Mr. Joy, one on Safety Attachments to Locomotive Boilers, reports on Side-Rods; New Plans of Construction and Improvement of Locomotive Engines, the Best Method of offering Premiums to Engineers and Firemen to Induce Economy in the Running of Locomotive Engines, Standard Iron Gauge, a paper on the American Fast Express Locomotive, and memoirs of A. L. Holley, Wm. Rushton, H. E. Woods and Wm. S. Hudson. There are also discussions on nearly all the reports, all of them of more or less interest.

*Statistics.*—"Railroads, grain and produce, cotton, petroleum, mining dividends and production," are subjects covered by this little book, which is issued yearly at this season by the *Daily Graphic*, a journal which makes frequent and good use of statistics, in its commercial and financial columns. By far the larger part of the volume is taken up with railroad statistics, forming a sort of miniature Poor's Manual. The data given usually include mileage and equipment, stocks and bonds (usually each issue separately), gross and net earnings, fixed charges and the surplus over fixed charges; and the figures for earnings, etc., are usually given for from two to five years. Issued at this season it is able to give for many companies figures for a year later than could be obtained for Poor's Manual, including the Chicago & Northwestern, the Louisville & Nashville, the New York Central, the Erie, and most of the Massachusetts roads. The roads are arranged alphabeti-

cally, the volume is small and easily handled and referred to, and its bright pink cover makes it conspicuous in any wilderness of papers and pamphlets on an office table, and it costs but a very small sum.

*Die Eisenbahn (The Railroad)* a small weekly paper published in Switzerland for several years past, but most of the time not so much devoted to railroads as to general engineering, and especially to architecture, appears hereafter as the *Schweizerische Bauzeitung*, with contents about the same as heretofore. The journal is and has been the organ of the Swiss Society of Engineers and Architects, and of the Zurich Polytechnicum Alumni Association, and has much of interest to engineers and architects, and of course to old Zurich students, of whom there is a sprinkling in this country. The publisher is A. Waldner, Zurich.

*School of the Railroad Service* we might call the German work of Brosius and Koch entitled *Die Schule für den ausseren Eisenbahn Betrieb*, the third part of which, completing the work, has just been received by Gustav Stechert, No. 766 Broadway, New York. The work is intended to give a summary of what every railroad man ought to know, and treats of all departments except office service—of road, locomotives and cars, road service, train and station service—of course all calculated for the service as it exists in Germany, and referring constantly to the government regulations there in force, and those of the German Railroad Union. Probably nowhere else can a better general idea be obtained of German methods of construction and operation. The authors are well known by a work for locomotive men, in character something like Forney's "Catechism of the Locomotive," which has been very popular in Germany, and has been translated into French, Italian and Polish. Their success with that book gives confidence that they have adequately treated this new work.

*The Relations of the Pennsylvania Railroad Company to Other Organizations in which it holds an interest.*

One of the most interesting features in a railroad organization is its method of extension to those companies and lines over which it obtains control. Capability of development is in this way tested as in no other. Direct control is probably the simplest and most economical method of operating a small road; but direct control by one head issuing orders for all the various operations of a road finds its limits tested by economy merely. It is often forgotten that capacity for future growth is obtained only at some immediate loss. Without some division and sub-division of authority there is no loss to the future, and as exists in all organized bodies for reproduction, and there is little power of growth sacrificed to future efficiency. Organization of any kind looks forward to a future of continued action and to emergencies.

The strength and soundness of the principles on which the Pennsylvania Railroad was organized have been fully tested in its method of control over lines which it, in fact, may be said to have made part of its system. Of the lines east of Pittsburgh, the Northern Central alone will be spoken of in detail.

#### THE NORTHERN CENTRAL RAILROAD COMPANY.

This company is a distinct and separate organization united to the Pennsylvania Railroad Company by control of offices by persons holding similar positions in both companies. Its President, its General Manager, General Superintendent of Motive Power, its Chief Engineer, its General and Assistant Solicitors, its General Freight and Passenger Agents, are the same persons filling like offices on the Pennsylvania Railroad. Other offices in the organization are filled by gentlemen having no connection with the Pennsylvania Railroad Company, as that of Auditor, Cashier, Purchasing-Agent, Secretary, General Superintendent, Superintendent of Motive Power, and other operating offices; although one division has a Superintendent who is also a General Superintendent of the Pennsylvania Railroad (Philadelphia & Erie Division). Throughout the road the standards and methods used on the Pennsylvania Railroad are adopted, and there is the same system of accounts; but all the relations of account between the two roads are in every respect the same as between the Pennsylvania Railroad and any foreign road. Bills are rendered and paid by draft on the Treasurer of the debtor road. Some of the directors of the Pennsylvania Railroad Company are also members of the board of directors of the Northern Central, which holds its meetings in Baltimore. The Vice President of the Pennsylvania Railroad Company controlling its transportation passenger and freight departments is also Vice-President of the Northern Central; but except as regards oversight of moneys expended by the Pennsylvania Railroad Company for the benefit of the Northern Central, the other Vice-Presidents of the former company have no relations with the latter.

Nevertheless it will be seen that in fact the Pennsylvania Railroad Company entirely and in every respect controls the Northern Central, although with full respect to its individuality, and, it should be added, under the sanction of a separate board of directors.

The organization of the Baltimore & Potomac Railroad Company is very nearly a duplicate of the Northern Central's as to all important facts. The same is true, although to a less extent, of the Philadelphia, Wilmington & Baltimore Railroad Company, which, however, retains its former President.

#### THE PENNSYLVANIA COMPANY.

The lines and properties controlled by the Pennsylvania Railroad Company west of Pittsburgh furnish a new set of



facts which are met by a new adaptation of the principles of the parent organization.

Distance, from its locality, is itself an important fact affecting the control of any system or portion of system by a central authority. When the Pennsylvania Railroad Company has acquired control of the more important lines forming the northwest and southwest systems (into which the lines west of Pittsburgh are divided) it was found necessary for this and other reasons to have a separate organization. In 1870, the Pennsylvania Company was formed, and to it the Pennsylvania Railroad Company transferred its interests "owned, controlled and operated" in lines and properties west of Pittsburgh, although the Pittsburgh, Cincinnati & St. Louis Railway Company continued as a distinct organization in which the Pennsylvania Company holds a controlling interest. In return for this transfer the Pennsylvania Railroad Company received stock of the Pennsylvania Company. Here we have a triple set of organizations, united to each other, so far as personal control is concerned, only by directors who hold office in both companies and by the President of the Pennsylvania Railroad Company, who is also President of the Pennsylvania Company and of the Pittsburgh, Cincinnati & St. Louis Railway Company. The offices of First, Second and Third Vice-Presidents and of Assistant Controller, of Secretary, Assistant Secretary, General Counsel, Assistant Counsel, General and Assistant Passenger and Ticket Agent and Purchasing Agent are held by the same persons in both the Pennsylvania Company and in the Pittsburgh, Cincinnati and St. Louis Railway Company. In general, each system is operated by the methods in use on the Pennsylvania Railroad; but the facts of the road make it necessary, or at least wise, that these methods should be extended gradually. There are legal difficulties in the way of an organic union of the two systems, and so extensive a network of lines has been found to require time for any practical amalgamation. Although, therefore, the original organization common to both provided for a General Manager who should be the same person for each; it has been found more convenient to leave this office vacant and place the operation and maintenance of each system under the control of a Manager responsible to the first Vice-President. The Manager of each system has a Chief Engineer and a Superintendent of Motive Power, who form his staff. There are no general superintendents, division superintendents being responsible directly to the Manager. Each division superintendent has an engineer of maintenance of way, under whom are supervisors. The Chief Engineer is strictly a staff officer of the Manager, and has no control over the division superintendents. In practice, however, there is a relation between this officer and the superintendents as regards road and engineering matters, which we are inclined to regard as theoretically the best solution of the problem involved in the distribution of responsibility and control of over maintenance of way.

There is no doubt that a road may be successfully managed by a variety of methods of distributing authority, especially as regards road-bed; if, however, the organization be looked at from the standpoint of emergency involving persons and personal relations of all kinds, it must be judged by the principles involved; for in time these principles will surely bear fruit of one kind or another.

One of the soundest principles of organization of human beings for any purpose is that control and responsibility must go together; and if the superintendent of a division is to be made responsible for its expense as well as its condition, he must control both, and whatever is necessary thereto—speaking in a general way.

If the road be divided into an engineering and a transportation department with a separate control for each, this cannot be possible. It is possible, but only to a degree, if the officers of maintenance of way on a division are placed under the control of the division superintendent, but subject through him to the orders of the engineering department; nevertheless even here we have a certain separation of control and responsibility. If, however, as well, the Chief Engineer be a staff officer of the Manager, and division superintendents be required to advise with him on all important matters connected with the road, the benefit of his knowledge and experience may be obtained without division of responsibility as to expenses and as to supreme control. It should be noted that we are looking at the matter in the light of possible difficulties and supposing a given end; practically as we have said, individual roads are worked successfully on a variety of plans. The accounts of both companies are kept on a system which has already been described in the *Railroad Gazette*. To the First Vice-President (as to the Second Vice-President of the Pennsylvania Railroad) are responsible, both the departments making rates and the departments controlling transportation; and, as in the parent organization, the accounting department is independent, finding its head in a Vice-President. The Purchasing Agent is responsible to each Manager, and does not report to a committee on supplies as in the Pennsylvania Railroad and Northern Central organizations. The board of directors of the Pennsylvania Company as individuals would find it difficult to meet on call at Pittsburgh; some system of control which should be intermediate between the board (including the President, also resident at a distance) was found to be necessary; and here the difficulty was met by the formal recognition of a principle, informally everywhere existing in the Pennsylvania Railroad organization, and from which arises that wisdom of action which seems personal, but is always co-operative. There are two committees of five formed by the same persons, the First Vice-President being chairman of the Executive Committee, the Second Vice-President of the Finance Committee. These

committees are composed of the three Vice-Presidents and two other members of the boards of the two companies (Pennsylvania Company and the Pittsburgh, Cincinnati & St. Louis Company), and act as a board of control over all officers and in all affairs as representatives of the President and the board. In fact, however, as will be seen by the list, this control is a formal method of organizing the co-operative strength and wisdom of this immediate executive officers and securing its influence upon the acts of each. Of these committees, and always in ascendancy, the President of the entire system of the Pennsylvania Railroad Company is *ex officio* a member.

If the policy of immediate control by one head was the organic principle of the Pennsylvania Railroad, it is easy to see that the extension of this principle to so large a system as that west of Pittsburgh might result in two presidents, one at Pittsburgh, as well as one at Philadelphia. But the fundamental principle being organization and corporation, a control at Pittsburgh becomes possible, wise and efficient, but not personal.

The Little Allegheny Valley Railroad offers an example of a still different type of control. Nearly all of its board of managers are officers of the Pennsylvania Railroad; and have an active influence through the President of the board. The road, however, retains not only its individuality, but except in certain features of the road-bed and track, is not conformed to Pennsylvania standards. Nevertheless, as we have indicated, its policy is determined by the Pennsylvania Railroad, which thus by methods adopted to each set of facts extends its influence as an organization throughout one of the most, if not the most, extensive railroad system of the world.

#### Recommendations of the Minnesota Railroad Commissioner.

The following is a summary of the recommendations of Commissioner Baker in his annual report recently issued:

First—The establishing of a Board of Railroad Commissioners for the consideration of such grave questions as are in their nature too important to be left to the judgment of any one man, the Governor and the Auditor of State *ex officio*, together with the Railroad Commissioners, to constitute for the present such commission.

Second—That any recommendation, in writing, by such Commission, or a majority of them, shall be deemed *prima facie* a fair determination of the matter to which it relates by the companies operating railroads, by the courts of the state, and any other party interested.

Third—That the Legislature, under certain conditions, shall prescribe rules by which maximum rates shall be established.

Fourth—That telegraph and telephone companies be placed under the surveillance of the Railroad Commissioner, as in Ohio, and in like manner as railway companies; and that such company be taxed on a basis of gross income, instead of property valuation.

Fifth—That street-car companies be required to report all their business and condition, as in Massachusetts and New York, except as to taxes, which should be local.

Sixth—That railway sleeping-car companies, not now reporting and wholly untaxed, be required to report to the Commissioner, and to pay taxes on a basis of gross earnings.

Seventh—That railway companies, in the matter of furnishing cars to shippers, shall not favor elevator companies to the exclusion of other persons, but shall perform all their duties as common carriers without discrimination.

Eighth—That the public convenience requires a new compilation of all laws relating to all railways, the same to be issued under the supervision of the Commissioner, the Egeron compilation being now out of date.

Ninth—That elevator companies be required to report the amount and quality of grain received and shipped to this office for statistical purposes.

Tenth—That all stock-yard and transit companies be required to report their receipts and shipments of stock to this office for statistical purposes.

Eleventh—That in general more power be conferred upon the Commissioner's office for the enforcement of all laws and regulations affecting railways.

Twelfth—That the use of intoxicating drinks by railway employees be prohibited by law, as in Michigan; this is a police regulation.

Thirteenth—That all public records touching railway matters be henceforth kept in the office of the Railroad Commissioner.

Fourteenth—That more stringent penalties be provided compelling railway companies to report to this office with greater promptness.

Fifteenth—That adequate provisions be made by which this office can examine into and fix the responsibility for accidents resulting in personal injury or loss of life.

Sixteenth—That railway companies shall so keep their books as to correctly show the amount of business done and expenditures made on that portion of their lines operated in the state.

Seventeenth—That the Commissioner be authorized to prepare an official railway map of the state, to accompany the annual report.

Eighteenth—That railway companies be required to give greater publicity to tariff rates; and that no important or violent changes in rates shall be made without due notice to the public through the office of the Railroad Commissioner.

Nineteenth—That more adequate protection against snow blockades be provided.

Twentieth—That certain existing provisions of the law which work a hardship in trials for personal injury be remedied.

Twenty-first—That no consolidation of railway corporations shall take place by authority of law until such proposed consolidation shall have been submitted to and received the approval of the Board of Railway Commissioners.

Twenty-second—That if "pooling" is to exist in the state it should be regulated by law so that local interests may not be burdened with alleged losses at competitive points.

Twenty-third—That railway companies shall not have the exclusive power to determine the size and location of elevators or other grain warehouses, and shall place no restriction upon shippers; and, in a contest between an individual and a company on this point, the Railway Commissioners shall decide.

Twenty-fourth—That such proper clerical force be authorized for this office as will not only enable it to transact the business now actually pressing, but to supply it with adequate force to reorganize the office upon a basis commensurate with its increasing duties and responsibilities.

#### Struggles to Extend the Harlem Railroad Forty Year Ago.

The following, taken from the *New World*, Park Benjamin, editor, New York, Nov. 4, 1843, p. 549, will indicate the effort required 40 years ago to build a few miles of railroad:

**HARLEM RAILROAD.**—The condition and affairs of this road have been, and still continue to be, the subject of considerable discussion, as well among individuals as in the columns of the daily press. We have hitherto refrained from the expression of an opinion, either pro or con, in regard to it, not because we have not felt an interest, but because a press of other matter has occupied our time and space. Nor should we have broached upon it had we not listened to the tirades of malicious abuse which have assailed our ears, from a writer in one of the morning papers, "until forbearance has ceased to be a virtue."

In a recent article, he has the following: "We learn that this concern is making a desperate effort to construct their railroad up to Tuckahoe factory, mainly by loans from Westchester, with the promise of extending to White Plains, and thus to bubble up the stock. \* \* If we are correctly informed, they have applied to self-interest, and to local feelings, to induce the owner of another large marble quarry to extend the road to Tuckahoe, mainly on its subscriptions; but the road to be built in a 'make-shift manner,' and not in conformity to the advice of engineers of intelligence and capacity that have been consulted on the subject."

An effort has been made to extend the road to Tuckahoe factory; and as an evidence of the probability of its success, we would state that the contractors, whom the company have employed, "broke ground" for the extension on Monday morning, the 30th ult.; and further, that the company are now in possession of ample means and resources to finish, without delay, the contemplated improvement, and this, too, not "mainly by loans in Westchester," but from the voluntary contributions of a great number of stock-holders, both in this city and in Westchester.

That there was anything "desperate" in the character of the effort, is most unqualifiedly false. So much was it of an opposite nature, that the "bills" and "bears," as they are denominated, who have speculated in the stock of the company, were totally unaware of its having been made until the arrangements had all been completed, and operations had actually been commenced.

So far as an appeal to "self-interest" and local feelings is concerned, our contemporary has been "correctly informed;" for it is from no other motives that the parties either in Westchester or in New York have been desired to act. But they have required no appeal, no urging to participate in an undertaking which was so clearly designed for the interest and advantage of all concerned. So far from any individual having been the principal contributor toward the present extension, a degree of rivalry has been manifested by the residents in the vicinity in the assistance which they have afforded.

The proposed extension is under contract at an expense much less than that of the portion of the road now completed; but this fact does not leave the influence that it is to be constructed in a manner not equally substantial, as well as of equal capacity and durability. On the contrary, it speaks loudly for the shrewdness and good management of those to whom the negotiation of the contract was confided, and indicates clearly that the extravagance and recklessness which have heretofore characterized the management of the road have been thoroughly reformed.

As regards the character and objects of those whose management the road is now under, much has been said, and a great deal of unnecessary doubt and anxiety has been the consequence. In respect to the former, they are men who for intelligence, business capacity and shrewdness are unsurpassed in this community; men to whom the interests and affairs of the road can be committed with the most implicit confidence; and, in respect to the latter, we have no hesitation in saying that their object is solely to promote their own interests, and of consequence those of the company over which they preside as directors, for it is clear to an impartial observer that it is only by good management and the strictest regard to economy that the stockholders can realize the expectations which they have been led to awaken, and as the directors are, some of them, if not all, the largest stockholders, it is fair to conclude that as rational men they will adopt such a course as is best calculated to result to their advantage.

As to the probability of the road receiving an additional amount of patronage more than commensurate with the expense of completing the extension to White Plains there can be no question. It will at once afford a safe and speedy means of communication between a large tract of the most fertile and productive land, and one of the best markets for those products in the United States. In addition to the immense amount of freight which this communication will give the road, there would also be a like increase in the amount of travel over it, both for pleasure and business, which would, of course, produce a proportionate increase in the receipts without materially adding to the expense of transportation.

We can attribute the opposition of the writer, to whom we have before alluded, to no other motives than that of a desire either to gratify his own prejudice or that for the person for whom he writes, as we have never been able to detect in his articles any one attribute of an argument; on the contrary, they have always been "mainly" characterized by nothing but insinuations, without foundation, and abuse without cause.

#### Kansas and Nebraska Governors on Railroad Legislation.

The new Governor of Kansas, in his message to the Legislature, complains that the consolidation of railroads in that state has been to the detriment of the public, and that since it has been effected there has been a growing antagonism between the railroads and the public. The railroads, he says, "have used the state and its resources to the detriment and injury of its agricultural, commercial and manufacturing interests." Rates, he says, are so high that if maintained farming in the western half of the state will have to be abandoned. He submits to the Legislature the following propositions:

"First—That railroads are public highways, created by the authority of the state, for the benefit of the state.

"Second—That railroads are common carriers, and as such shall receive and have the right to demand just and reasonable compensation for service rendered, and have no legal or equitable rights to charge excessive or exorbitant rates.

"Third—That all persons have a right to their use on like conditions.

"Fourth—That the Legislature has the right and power to regulate them in all these respects and particulars mentioned, including the right to fix rates of freights and fare.

"Railroads should not be permitted to increase their rates on any articles transported by them, until thirty days' notice posted in the station where goods are received and



delivered; and they should not be allowed to increase the rates on car-loads by excessive terminal charges, or for switching; and that the rate per hundred pounds should be specified in the shipping-bill or receipt given for the article shipped, and the consignee should not be required to pay a greater rate than that named in the shipping-bill or receipt."

As nearly every railroad in Kansas has been through bankruptcy within the past ten years, it may be suspected that the charges of extortion are exaggerated. The western half of the state has an extremely thin traffic, and at the highest rates attainable cannot afford very large earnings for any of the roads in it, most of which would doubtless never have been built but for the traffic to and from the country further west.

There is said to be in the Kansas Legislature a very strong feeling in favor of regulating railroad rates.

The Governor of Nebraska in his message said:

"Important questions of state policy involving the regulation of rates of transportation over railroads require your careful consideration. The problem is a comparatively new one in state and national affairs, and its solution is attended with difficulties of a complicated character. To determine what legislation is necessary for the purpose of subjecting railroad corporations to proper legal control, with injustice neither to the people nor to the railroads, requires a very thorough knowledge of railroad construction and management, and also a clear understanding of the abuses complained of by the public. Judicious legislation to accomplish this object is demanded by the substantial business-men and farmers of the state. The clamor of those who are conducting an indiscriminate war upon railroads, for the obvious purpose of advancing their own personal or political interests, should be studiously ignored. It is as much your duty to prevent mischievous legislation upon this subject as it is to provide that which is based upon exact principles of justice."

The Governor invites attention to the Illinois and the Iowa railroad laws and commissions, and thinks the problem can be best dealt with by a railroad commission. In this state as in Kansas there is said to be a large number of members of the Legislature in favor of regulating rates.

#### The Tanner Brake—The History of a Patent Case.

The Tanner brake cases involved so many companies and such large amounts, that the following history of the patent and the suits, given in the report of the Western Railroad Association, will be of interest to many persons:

Some time in the latter part of 1846, Batchelder & Thompson, of Lowell, Mass., invented a car brake to be operated by the cars crowding against each other, by means of a long rod or bar running under the centre of each car. It was a wretched contrivance, and never came into use. They applied for a patent in June, 1847, but owing to various delays, caused partly by their ignorance and inexperience, and partly by their neglect, their application was kept pending in the Patent Office till July 1852. In the meantime the Hodge and the Stevens brakes had both been invented and patented, the one in 1840 and the other in 1851. In 1846 or '47, Willard J. Nicholls, of Hartford, invented the same thing as that which has been known for the last 30 years as the Tanner brake. He put it into use, but never applied for a patent. In November, 1848, one Turner obtained a patent for a double brake bearing some resemblance both to the Batchelder & Thompson and the Nicholls. It was a bumper-brake and a hand-brake combined. It had also a centre lever, but not arranged like the Nicholls.

Now commences the most curious part of this story. In 1850 or '51, Henry Tanner, of Buffalo, bought the Turner patent above mentioned, and went about the country attempting to bring it into use. In this he met with little or no success, but in other respects he was more fortunate. In the course of his travels he came across the Nicholls brake, and finding it far superior to the Turner, he gave up the Turner, and adopted the Nicholls in its place. As there was no patent, however, on the Nicholls brake, and as a patent of some sort was necessary, he determined to re-issue the Turner patent, with a claim that would include the invention of Nicholls. But on going to Washington for that purpose he (in some way that has never been explained) was made aware of the pending application of Batchelder & Thompson. As he had already shifted his ground from Turner to Nicholls, so now he resolved to shift again from Nicholls. He bought out Batchelder & Thompson, canceled their model, specifications and drawings, and substituted in their place a new set of papers to suit the Nicholls; and on July 6, 1852, the patent was issued, not for the bumper-brake of Batchelder & Thompson, but for the hand-brake of Willard J. Nicholls, since known as the Tanner brake. As a justification for all this, it has since been alleged that Batchelder & Thompson also invented this same brake, and some months earlier than Nicholls; but, while this may be true, it must be admitted to be extremely improbable.

In 1853, Tanner began a suit against the Erie road for infringing his patent by using the Hodge and Stevens brakes. The jury found in his favor and awarded him \$439 as damages and costs. A similar suit against the Hudson River road was settled by the payment of \$1,000.

In 1855, Thomas Sayles, of Lansingburg, N. Y., having previously become owner of the patent, filed a bill against the Erie road for an injunction, which was settled together with the suit at law for \$2,300.

As the natural result of this litigation, a large number of roads took licenses under the Tanner patent, paying therefor at the rate of \$5 per mile. The greater number, however, still holding out, in 1858 Sayles filed a bill in Pennsylvania against the Philadelphia, Wilmington & Baltimore road, but after the evidence was all in, he for some reason concluded to dismiss that suit and to commence again in another jurisdiction.

He accordingly filed his bill in Illinois against the Chicago & Northwestern road Dec. 28, 1861; the case was heard before Judge Drummond, and a decree entered in favor of complainant in February, 1866, with the usual order of reference to the master to take an account. While this was pending the defendants obtained evidence of the use of a double brake like the Tanner on the Camden & Amboy road in 1843; and on application to the Court leave was given them to take additional proofs, when the matter was again argued, and again decided in favor of complainant in July, 1871.

The accounting before the master, which was next in order, occupied a long time, and the loss of all the papers by fire caused additional delay; but a final decree, as was supposed, was at last reached in December, 1873. By this decree the defendants were to pay for five years' infringement on a small part of their road, \$63,638.40, being at the rate of about \$450 per car per year, two-thirds for the saving in brakemen, and one-third for the saving in wheels. If all the roads in the country had paid at the same rate, the total amount for the 21 years of the patent would have been about \$90,000,000.

A petition having been filed, however, to set aside this decree, also on the ground of newly discovered evidence, the matter was again argued at great length, and at last finally decided in September, 1875. By this decision the Court affirmed all its previous findings, but at the same time

struck off some \$16,900 from the decree, without assigning any reason, but undoubtedly on the ground that the damages were excessive. The decree as finally entered was still sufficiently onerous, the savings (1) now being about \$350 per car per year, and the total value of the patent \$70,000,000.

From this decree defendants appealed to the Supreme Court, where the decree was reversed in November, 1878, and the cause remanded, with directions to dismiss the bill on the ground of non-infringement. This released absolutely not only the defendant in that suit, but all others who had used the Stevens brake, comprising a large proportion of the roads, especially at the West. The opinion of the Court further indicated pretty clearly that the Hodge brake, when its turn came, would also be held no infringement, and that the Tanner patent itself would be held invalid on account of the change made in the application as above stated. But, as neither of these points was decided, it left Sayles at liberty to continue the litigation. He had already in 1877 brought some 200 new suits, 33 of which were against members of this Association, 30 in equity and three at law. In the equity suits it was objected by defendants that the patent having expired, there could be no injunction and that consequently the Court had no jurisdiction. Judge Hughes, of Virginia, was the only one among all the circuit and district judges who gave his assent to this doctrine, all the others before whom the question came holding that equity had jurisdiction, some resting it on the right to a discovery and account, some on the act of Congress and some on the theory that the defendant in a patent suit is a trustee.

The question came at last before the Supreme Court in Root, Executor, etc., vs. the Lake Shore & Michigan Southern road, and there it was finally decided in January last that a suit for infringement, as a general rule, cannot be maintained in equity after the expiration of the patent.

After obtaining his decree against the Chicago & Northwestern Railway Co., Sayles offered to settle with the railroads for \$15,000,000 and *passes*. He gradually reduced his demand to \$3,000,000 and after that decree had been reversed in the Supreme Court, he came down to \$350,000.

He was now dead, and his executor was willing to settle for \$500, which after some hesitation it was thought best to pay, and thus ended this litigation so far as Sayles' interest was concerned. A similar settlement was subsequently made by the Eastern Railroad Association.

There is another branch of the case, however, that should be briefly considered. There was no dispute about Sayles' title to the original patent, but his right to the extension was seriously controverted by S. D. Cozzens, Esq., of New York, who claimed to own it under assignments from Tanner, and Batchelder & Way, Way being Thompson's executor; and there is little doubt that Sayles himself at first supposed Cozzens' title to be good. It was, of course, Cozzens' interest, therefore, that the patent should be sustained, and he accordingly acted as counsel for Sayles in the principal litigation, without receiving any reward. This dispute as to the title to the extension had one good effect. It prevented some roads from settling who might otherwise have paid considerable sums, either to Cozzens or Sayles, but were unwilling to pay both.

From 1871 to 1875, Cozzens brought a number of suits under the extension of the Tanner patent in the name of James D. Mowry as trustee. But before any of these suits came on for hearing, the Supreme Court had decided, in the case of Hendrie vs. Sayles, that the extension belonged to Sayles, except the state of Illinois, which has always been conceded to belong to Cozzens.

In 1879, Cozzens dismissed these Mowry suits and filed a new series of bills in the name of Peter P. Parrot, claiming now that Mowry had no title. These bills were also dismissed in April of this year, on the authority of Root vs. the Lake Shore Company, and thus ended this long, bitterly contested and costly litigation.

A large number of suits brought by Cozzens, in the name of Vaughan, under the Hodge patent, were in like manner dismissed for want of jurisdiction, on the same grounds.

#### THE SCRAP HEAP.

##### Locomotive Building.

The Taunton Locomotive Manufacturing Co. in Taunton, Mass., is completing an order for 12 consolidation engines for the Union Pacific road.

The Baldwin Locomotive Works in Philadelphia have lately completed the delivery of 60 locomotives to the Pennsylvania Railroad and are building 30 for the Philadelphia & Reading. These works last year built 563 engines, 120 of which went to foreign countries.

The Schenectady Locomotive Works in Schenectady, N. Y., are to build several heavy passenger engines for the Cincinnati, Indianapolis & Chicago road.

The Manchester Locomotive Works in Manchester, N. H., are building several engines for the Intercolonial Railway in Canada.

The Portland Co. in Portland Me., are building a number of locomotives for the Northern Pacific road. About five a month are turned out.

T. H. Paul & Sons are removing their machine works from Cumberland, Md., to Baltimore. As soon as their new buildings are finished and the machinery in place they intend to begin the manufacture of locomotives. They expect to employ nearly 500 men.

The Rhode Island Locomotive Works in Providence are building five ten-wheel freight engines for the New York, New Haven & Hartford road. They have 19 by 26-in. cylinder, six 5-ft. drivers and a four-wheeled truck. They will be, we believe, the first engines on this road of any but the usual eight-wheeled pattern, to which the New Haven road has always very tenaciously adhered.

##### Car Notes.

The Laconia Car Co. at Laconia, N. H., has completed three handsome passenger cars of 2 ft. gauge for the Bridgeton & Saco River road in Maine.

The Wason Manufacturing Co. at Brightwood (Springfield), Mass., is building 14 new passenger cars for the Boston & Providence road. Four of them have already been delivered.

The Barney & Smith Manufacturing Co. in Dayton, O., is building several sleeping and drawing-room cars for the Shore Line between New York and Boston.

The New York & New England shops at Norwood, Mass., have recently completed three new passenger cars for use on suburban trains.

The Rochester Car Wheel Works in Rochester, N. Y., are turning out 100 wheels a day, with plenty of work on hand. Brown, Bonnell & Co. at Youngstown, O., are putting up special machinery for forging car-truck irons.

##### Bridge Notes.

Alden & Lassic, of the Rochester Bridge & Iron Works, are putting up an iron bridge over the canal in Rochester, N. Y., for the Genesee Valley road.

The Morse Bridge Co. is running its works in Youngstown, O., day and night, to fill some large contracts.

The Toronto Bridge Co. at Toronto, Ont., has the contract

for the bridges on the new Ontario & Quebec road, including two viaducts near Toronto, each 900 ft. long and about 100 ft. high.

##### Iron Notes.

The Western Pig Iron Association was organized at a largely attended meeting in Pittsburgh, Jan. 11, with John J. Spearman, of Sharon, Pa., President, Joseph D. Weeks, of Pittsburgh, Secretary and Treasurer, and vice-presidents representing Pennsylvania, Ohio and Alabama. The headquarters will be in Pittsburgh, and all meetings will be held in that city.

The St. Louis Bolt & Iron Co. is putting up a new mill for rolling light rails.

Martell Furnace at St. Ignace, Mich., has been repaired and will go into blast again in a few days.

The new rolling mill at Cannonsburg, Pa., has started up. It is making sheet iron at present.

Brown, Bonnell & Co. at Youngstown, O., are running their spike mill on railroad spikes, and have some heavy orders to fill.

The Cleveland Rolling Mill Co. in Cleveland, O., started up its large bar mill last week.

The Youngstown Rolling Mill Co. in Youngstown, O., is running its mill full double turn.

The rolling mill of the Corns Iron Co. in Massillon, O., was damaged by fire last week.

##### Manufacturing Notes.

The American Brake Co., of St. Louis, has established its Chicago office at No. 234 South Clark street in that city. The manager is Mr. W. R. Crumpton, late of the Chicago, Burlington & Quincy and a well-known railroad man.

Fairbanks & Co. at their works in St. Johnsbury, Vt., last year made over 80,000 scales of various kinds, the largest number ever turned out. This product included no less than 9,450 track-scales.

##### The Rail Market.

**Steel Rails.**—The market is quiet and quotations continue at \$40 per ton at mill, although large orders can probably be placed at a little less. Very small lots for immediate delivery may be made at a little higher price, but \$40 seems likely to remain the limit.

**Iron Rails.**—Quotations cannot be had, and the iron rail trade seems to be entirely dead. With steel rails at \$40 there is not much demand for iron.

**Rail Fastenings.**—Spikes are quoted at \$3 per 100 lbs. in Pittsburgh, with fair demand. Rail splice-bars or fish-plates are quoted at \$2.40 to \$2.50 per 100 lbs., with considerable concessions for large orders. Track-bolts are quoted at \$3.50 to \$3.75 per 100 lbs. for square nuts, and \$3.75 to \$3.90 for hexagon, in Pittsburgh.

**Old Rails.**—Eastern markets are bare of old iron rails just now, and quotations are entirely nominal.

##### The Springfield Iron Co.

This company has begun to make extensive changes in its rolling mill in Springfield, Ill., which has been hitherto run chiefly on rails. It is not, however, intended to permanently discontinue the manufacture of either iron or steel rails. But, the market for both being just now in a dull condition and affording no profit, the business has been suspended for the time being. It can, however, be taken up again at short notice, and will be whenever the state of the trade will justify it.

In the meantime new rolls have been ordered to take the place of those heretofore used in rolling rails; these new rolls to be used for rolling steel plates for boilers, tanks, agricultural implements, etc. Rolls are also being prepared to take steel blooms from the blooming mill, and reduce them to billets, which in turn will go into the bar mill, and make steel bars of all shapes and sizes for machinery purposes, and for the general trade. It is expected that these changes and improvements will be completed by Feb. 1, and that the company from that time forward will be enabled to offer for sale all sorts of merchant steel and also steel plates for all purposes.

The company has also contracted for several large steam hammers, with the expectation of building a forge and making all sorts of steel forgings, such as heavy shafts, crank pins, axles, etc.

The most important improvement in contemplation, however, is a plate mill for rolling steel plates of large size and great weight, direct from the ingot. Contracts have been made for a Porter-Allen engine to run this mill. It will be a horizontal engine, with a cylinder 44 in. in diameter by 48 in. stroke. The fly wheel is to be 22 ft. in diameter, and to weigh 30 tons. The engine will run 100 revolutions per minute. The train of rolls is to be very heavy, and calculated to roll a plate over 9 ft. wide, and, if necessary, 30 ft. long. A separate building will be erected for this plate mill, and hydraulic cranes, lifting tables and other machinery for handling the heavy plates will be provided. This mill will hardly be ready for use before July.

The object of the company in making these changes and additions is to utilize the steel works and other plant, and to avoid the risks incurred by confinement to a single branch of manufacture.

##### A Traveled Rooster.

A rooster owned by Conductor Skein, of the Troy & Boston road, strayed from his roost near the company's freight yard in this city one night recently and perched itself upon the brake beam of an engine that left the yard with a freight train at 2.10 o'clock in the morning. Engineer Lee reached Pownal as the day was breaking and was startled by the crowing of a cock under his engine. An examination brought to light the undismayed rooster, which had quietly ridden 39 miles on the brake beam despite the jarring and suction of air under the engine. The feathered traveler was returned home.—Troy (N. Y.) Times.

##### Electric Light in Cars.

Experiments on lighting trains by electricity are being made on the Paris, Lyons & Mediterranean Railway, with, it is said, an "A" Gramme machine, Swan lamps, and 30 secondary batteries. The experimental train consists of two first-class carriages and two vans, the carriages and front van only being lighted—so far, it is said, with success.

##### Appliances for Safety of Passengers.

A provisional committee, with Mr. Charles Boyssot, Vice-President of the French Chamber, as President, has been formed for organizing an international exhibition of appliances calculated to insure the safety of railway passengers, to be held in the Palais de l'Industrie, Paris, in 1883. The three classes of objects to be admitted are: Systems of coupling, arrangements of signals, and various brakes.

##### Late Trains and Morality.

Jay Gould is trying to improve New York morality. He gives as a reason for stopping the late trains on the elevated road the statement that "The night trains are conducive to late hours and dissipation. If they do not run, people who would do otherwise will go home and the tone of society will be improved." The citizens fail to appreciate this moral reform agency, and are petitioning the Legislature to com-



pel the corporation to accommodate the public, or that portion of it which is so unfortunate as to be obliged to work after midnight.

#### A Car Load of Bees.

On Saturday a car containing a curious freight was switched on the East Tennessee & Virginia Railroad, and moved south.

It was filled with bee-hives. One hundred and forty of the latest styles of bee-hives, piled systematically on top of each other, and to the foreground a philosopher with his bed and board.

"Where are you going to take your bees?"  
"To Florida for the winter. My name is Thomas McFarland Jackson, and I live in Northern Missouri. I have large apiaries that are forced to lie idle in the winter. I'm going to take this carload of hives to Florida, where they can make honey every day in the year. As soon as the clover is out again in Northern Missouri I will take them back there."

"Will it pay you to move them?"  
"I think so. It costs me less than a dollar a hive for transportation, and each hive will have from \$3 to \$7 worth of honey in it when I bring them back. That is what Italian bees, I sent to Florida last year, did last winter. Only Italian bees will thrive in Florida, as the moths eat up the common bees."

"Will you live in the open air there?"  
"I'm going to camp around with my bees. I believe I will bring back about \$1,000 worth of honey in hives that would otherwise lie idle all the winter and be empty in the spring.—*Atlanta (Ga.) Constitution, Jan. 9.*

#### Brakes and Breaks.

There was a break or two in Allegheny, Pa., yesterday morning, resulting badly for a street car. In the first place, the brakeman in braking, broke the brake, whereupon the car broke loose and after breaking through the safety-gates, stood in front of an advancing train. The engineer of the latter applied the air-brake but couldn't brake up in time to prevent the breaking up of the car and a bone or two among its passengers. And all this was just after break-fast.—*Pittsburgh Telegraph, Jan. 13.*

#### Caught in a Sand Storm.

The Southern overland train which should have reached this city on Monday afternoon only arrived at 8:10 last night, having been delayed at Sumner by a terrific sand storm that raged through the Mojave Desert and spread out over a portion of the surrounding country. The storm began in the early morning, and when the train reached Sumner, in Kern County, had become a regular simoon. The wind swept across the sandy wastes with such violence that the train swayed and rocked under the violence of the blasts, and seemed ready to plunge from the track. The moon had become overcast in the early part of the night, and the journey was continued in a darkness that rapidly increased until the day began in Stygian gloom. The passengers, who had been aroused from their sleep by the fierce assaults of the wind and the dashing of the sand against the windows of the train, looked anxiously for the appearance of the sun, but no gleam of light relieved the forbidding darkness of the east. Night maintained her sway, and the blackness of the heavens grew intense with the morning, until the strong headlight of the locomotive almost failed to pierce it. The small portion of the desert which was exposed by the engine's lights only served to discourage the travelers. The track was lost under the billows of sand that were being tossed across the rails by the angry storm. The desert moved like a sea, and when the waves of sand struck the shivering sides of the train they scattered like spray and filled the air with a dust which made free breathing impossible.

The travelers' fears of being stopped by a sand-drift were soon realized. After leaving Sumner, which is 314 miles from San Francisco, the train moved cautiously for 10 miles through the shifting waste and then stopped with a crash. The alarmed passengers hardly dared to face the driving storm to learn the cause of the unpleasant halt. The few intrepid persons who ventured into the blinding simoon found that their express train had run into a freight train which had stopped in an impassable sand-drift. The slow rate of speed at which the express was moving enabled the engineer to stop the train in time to prevent a serious accident, and the collision was only sufficient to cast the locomotive from the track. The passenger cars remained on the rails. It was then 10 o'clock, so slowly had the express proceeded through the blinding storm after leaving Sumner. The darkness of the night had only increased, and nothing was visible except within the focus of the train's light. For five weary hours the passengers were compelled to remain on the detached train while relief was being obtained from Sumner. Assistance having arrived, the track was cleared of sand sufficiently to enable a relief engine to pull the express back to Sumner, where the passengers found slim accommodation until the storm blew over. Towards 5 o'clock in the afternoon the darkness began to disappear, but the simoon maintained its vigor until nightfall. Yesterday morning the unfortunate passengers proceeded on their journey, the remainder of which was made without sensational incident, as gangs of Chinese had been at work all night and had cleared the track of the accumulated sand-drift. At Tulare the express, which was due at 2:40 p. m. yesterday, overtook the belated and weather-beaten express, having passed with slight discomfort through the tail of the simoon. The breaking of a piston-rod delayed the first express still further at Lathrop, and the two trains came simultaneously to Oakland Wharf, the first over 30 hours behind time and the second over 6. All hands, however, arrived safe, and in the comforts of their hotels soon forgot the unpleasantness of their adventure and laughed over it.—*San Francisco Examiner, Jan. 3.*

#### Medical Lectures to Railroad Employees.

Arrangements have been made to give a course of six medical lectures to railroad employees at the reading room in the Grand Central Depot in New York, for the especial purpose of teaching them what to do in cases of emergency, and how to handle and care for persons injured. The lectures will each last one hour and will begin at 1 p. m., that being the hour when the largest number of trainmen are able to attend. The dates and subjects of the lectures are as follows:

Jan. 18.—A general outline of the structure and functions of the human body, including a brief description of the bones, muscles, arteries and veins. The functions of the circulation, respiration, and of the nervous system. The triangular and roller bandages—their application.

Jan. 25.—2. The general direction of the main arteries indicating the points where the circulation may be arrested by digital pressure, or by the application of a tourniquet. The difference between arterial, venous and capillary bleeding, and the various extemporaneous means of arresting it.

Feb. 1.—3. The signs of fracture and first aid to be rendered in such accidents. The application of splints and other restraining apparatus.

Feb. 8.—4. First aid to those suffering collapse from injury, to those stunned, to the apoplectic, inebriated, epileptic, fainting, and to those bitten by rabid animals.

The immediate treatment of the apparently drowned, or otherwise suffocated. Burns, scalds and poisons. Frozen limbs and sunstroke.

Feb. 15.—5. The improvised method of lifting and carrying the sick or injured. Methods of lifting and carrying the sick or injured on stretchers. The conveyance of such by rail or in country carts.

A portion of the hour allotted to these lectures will be devoted to practical work, such as the application of bandages, splints, tourniquets, restoration of the apparently drowned, lifting the injured, carrying on stretchers, etc. Sketches, charts, splints, tourniquets, stretchers, etc., are provided for experimental use. These lectures are free to all employees, and Superintendents Toucey, of the Central, and Stevenson of the New Haven road, request all employees to attend them.

#### New Sleeping Cars.

Two of the new sleeping cars for the Shore Line express were exhibited to the public yesterday afternoon in the Boston & Providence station. They are part of the equipment recently built by the Barney & Smith Manufacturing Co. of Dayton, O. The exterior is painted a rich, dark brown, relieved by gilding, and the inscription: "Wagner Shore Line Sleeping Car" and the car name "Boston" and "New London." One of the cars is finished inside in burl ash, and the other in black walnut. One has 16 sections, the other 12 sections and a stateroom containing two double and one single berth. All the berths are provided with spiral springs and hair mattresses, and the upper berths have a patent safety lock which prevents it from locking in case of its shutting up when any one is occupying it, thus guarding against the danger of a person being confined beyond escape in case of a car going off the rails and turning over. Several deaths from this cause, either by suffocation or burning, in accidents, having occurred, many people are very much averse to riding in the upper berths, but this safety lock renders them no more dangerous than the lower berths. The heating of the cars, by the Baker & Smith apparatus, and the excellent ventilation, make them very comfortable in any weather. They are mounted on six-wheel trucks, with iron frames, yoked on the outside, thus preventing lateral motion on going around curves, and 42-inch Allen paper wheels are used, which are said to ride remarkably easy, and to be very durable. The drawing-room cars are similar in style, and equally comfortable and well built. Their chairs are upholstered in green embossed plush, and the windows are very large. Mr. J. W. Richardson, Local Agent of the Shore Line, and Mr. B. Walter Burns, Superintendent of the Wagner cars in this city, exhibited and described the cars, and their improvements, to the visitors.—*Boston Advertiser, Jan. 13.*

#### Railroad Hardships.

Few people are aware of the vast amount of hardship and suffering that an ordinary freight brakeman is compelled to undergo in addition to the constant risk he runs of losing his life or being badly injured. For instance last Wednesday night about 10 o'clock an eastward bound freight train broke in two in the valley below Oxford and before the accident was discovered the forward part of the train had run two miles. The flagman was sent back immediately to flag the next following train, and there he was obliged to wait for three long hours on one of the most bitter nights of the season with the thermometer below zero, before the following train arrived, it having broken down about three miles back. When the flagman again reached his caboose he was almost perished with the cold, while his feet and hands were both badly frostbitten. There was no one to relieve him during all his long waiting, the balance of the train hands being on the forward part of the train. He stated that he walked and ran up and down the track during the entire time, and that he did not cover less than 15 miles during the three hours and yet he was hardly able to keep up a circulation of the blood. The above is only one of the almost daily hardships incident to railroading in winter, and yet a majority of the employees do not seem to mind it and prefer that life to any other.—*Port Jervis (N. Y.) Gazette, Jan. 13.*

#### Trade Catalogues.

The catalogue of the Grayden & Denton Manufacturing Co., manufacturers of dynamic rock drills, air compressors and steam pumps at Jersey city, N. J., contains, first, illustrations and description of the rock drill, invented and patented by Prof. De Volson Wood, of the Stevens Institute of Technology. Some of the engravings are what is known as "process" work and are only tolerable in their execution. Others showing the methods of applying the drills are good examples of the art of machine engraving. Following the description of the machine an article on the "Use of Steam Expansion in Rock Drills." "Horse Power of Rock Drills," "Cost of Drilling by Machine as Compared with Hand Labor," a list of duplicate parts, and a sort of catechism with the title "Pertinent Questions Regarding the Use of Compressed Air." This is followed by engravings and description of the dynamic air compressor, and a table of drills and compressors. There is also an engraving of the dynamic steam pump and a description of it and the interesting pamphlet concludes with testimonials from the users of the Wood rock drill.

The catalogue differs from most publications of its class from the fact that it gives at considerable length the kind of information which a person about to purchase this kind of machinery would want. Ordinarily commendation of the article described is the only sort of matter supplied to the readers of such literature.

"The Deane Steam Pumping Machinery" is the title of a catalogue issued by the Dean Steam Pump Co., of Holyoke, Mass. It has, first, an engraving showing a section of the pump with a brief but very clear description of its working. There are illustrations of various kinds of pumps for the following purposes: For feeding boilers or forcing water under pressure, double-acting plunger pumps adapted for the higher ranges of pressure and for muddy or gritty water, steam fire pumps and also a section of a cotton mill, showing the arrangement of a fire-extinguishing apparatus, tank pumps for raising water or other liquids to limited elevations, portable boiler and tank pump combined, direct-acting vacuum pumps for vacuum pans, brewery pump for hot or cold beer mash, etc., deep well pumps of several patterns with the steam cylinder above ground and the water cylinder below, several kinds of double-plunger pumps and piston pumps for mining use, sinking pumps which work vertically and are intended for sinking or recovering mines, pumping engines for raising large bodies of water from mines, pumps for use on board ship, hydraulic pressure pumps of several different kinds for operating hydraulic presses, cranes, testing machines, etc., power pumps to be worked by a belt, condensing apparatus, to be attached to ordinary high-pressure engines, with indicator diagrams taken on an engine, with and without the condensing apparatus attached; several large full-page engravings, showing the arrangement of the condensing apparatus in connection with an engine; air and circulating pumps, to be used in connection with surface condensers, water works' pumps, and others for special duties. Following these is an engraving showing a section of a pump with the parts all numbered. The names of the parts corresponding with the numbers are also given. The

volume concludes with directions to correspondents and for setting up and operating pumps with some useful general information.

The engraving is of the very best kind. Some of the full-page illustrations of the condensing apparatus are works of art. The printing also is of the best, and altogether so far as mechanical execution goes it would be difficult to get nearer perfection. The descriptions of the machines illustrated are, however, very meagre. Still as catalogues of this kind go this is one of the best. What will surprise even engineering readers is to see the great variety of pumps, which are now made, and the many adaptations of such machinery. It alone has become a distinct branch of engineering, and the volume before us shows how the work of engineers is becoming specialized and how hopeless it has become for any one to expect to be an expert in more than a very narrow field of that art or occupation.

"The Raoul Journal Box for Collapsible Journal Axes" is the title of a pamphlet published by the Columbus Iron Works Co., of Columbus, Ga., the manufacturers of the journal box. It contains, first, an admirably clear description of the journal box, for the elucidation of which the pamphlet was written; next is a wood engraving showing a perspective view of the box. After that there are twelve pages of engravings showing the box in sections and elevations of various kinds, made on a sufficiently large scale to be working drawings. There are also illustrations showing the proportions of the wheels and axle used with this box and also three views of an outside bearing engine truck of special design, with which the Raoul box is used. The drawings are all well made and full dimensions are also given.

There is a practical character about this descriptive circular that shows that those who prepared it knew exactly what they were aiming at and knew how to accomplish it. Both the description and the illustrations give the information which any one interested in the subject would be likely to want to learn, and instead of giving the reader a great mass of commendation the authors have elucidated the invention so that the reader is inclined to give his confidence to those who have written so clearly.

#### Railroad Young Men's Christian Association.

The branch of this Association located in New York now maintains reading rooms at the Grand Central depot for the employees of the New York Central & Hudson River and the New York, New Haven & Hartford roads, and at Thirtieth street station for the Central employees running to that station. The *Monthly Reporter*, published by the Association, gives the following statement of the work done at the two rooms during the year 1887: "The total daily attendance at the Grand Central depot room was 34,648, and Thirtieth street 18,521. At the Grand Central depot room, 51 Sunday services, 39 song services and 37 Bible studies were held with an attendance of 5,790, and at Thirtieth street 53 Sunday services, 51 song services and 50 Bible studies, showing the attendance 6,658.

"Number of letters written by employees at Grand Central room 1,276, and received for employees 1,284. At Thirtieth street 651 written, 541 received; 15 entertainments, with an attendance of 3,335 at Grand Central depot room, and at Thirtieth street 11, with 3,855 persons present. 11,431 papers were distributed, and 323 persons called for reading matter at Grand Central depot room, and 9,545 distributed, with 675 persons calling for reading matter at Thirtieth street. The number of visits to engine-houses, cabooses and shops from the Grand Central room was 656, and 109 visits to sick and injured employees, and at Thirtieth street 907 visits to engine-houses, etc., with 36 visits to sick and injured.

"The library was well used at both rooms, the number of volumes drawn from Grand Central depot was 1,606, and Thirtieth street 1,480.

"The baths taken at Grand Central depot are considered to be indispensable; the number taken was 1,297.

"The entire statistics give a larger showing than any previous year. We cordially invite all the employees to come in and we will try and make them feel at home."

The Executive Committee consists of Cornelius Vanderbilt, Chairman; Orin R. Stockwell, General Secretary; John M. Toucey, Charles M. Bissell, Wm. L. Squire, Wm. Buchanan, F. A. Haskell, Richard C. Morse, James Stokes, Jr., and John W. Horan.

#### Shooting the Baggage.

A correspondent of the *Railroader*, writing from Concord, N. H., says: "Transferring baggage, W. D. Hodgdon, station baggage-master, in handing a leather gun case into the baggage car, one barrel was discharged. Mr. Hodgdon received a serious wound between the hip and knee and several shot in his forehead over his right eye and others in the right hand. The wounds will be very painful. It is hoped no serious consequence will result. The gun belonged to Charles E. Morgan, of Wolfboro, an Engineer on the Eastern Railroad. The barrels were detached from the stock and placed in the case of ordinary leather. The carelessness of having it checked as ordinary baggage was unwarranted. Taking in account the crowded condition of the station at the time, the escape from more serious consequences must be regarded as very fortunate."

## General Railroad News.

### MEETINGS AND ANNOUNCEMENTS.

#### Meetings.

Meetings will be held as follows:  
*Fitchburg*, annual meeting, at the passenger station in Boston, Jan. 30, at 11:30 a. m.

*Newburg, Dutchess & Connecticut*, annual meeting at Moore's Mills, N. Y., Jan. 25.

*Buffalo, Pittsburgh & Western*, special meeting, at the office in Philadelphia, Feb. 5, at noon, to vote on an agreement of consolidation with the Buffalo, New York & Philadelphia and other companies. The *Oil City & Chicago* stockholders will meet at the same time and place.

#### Technical Meetings and Conventions.

The *American Institute of Mining Engineers* will hold its annual meeting in Boston, beginning on Tuesday, Feb. 20.

The *Master Mechanics' Association* will hold its annual convention in Chicago, June 19 next.

#### Dividends.

Dividends have been declared as follows:  
*Cincinnati, New Orleans & Texas Pacific*, 3 per cent. from the earnings of 1887, payable Feb. 5.

*Hannibal & St. Joseph*, 3 per cent., semi-annual, on the preferred stock, payable Feb. 15. Transfer books close Jan. 17. This company drops from 3½ to 3 per cent.

*Long Island*, 1 per cent., quarterly, payable Feb. 1. Transfer books close Jan. 20.

*Marquette, Houghton & Ontonagon*, 4 per cent. on both preferred and common stock, payable Feb. 15. Transfer books close Jan. 15. This is the first dividend on the common stock.

*North Carolina* (leased to Richmond & Danville), 6 per



cent., yearly, one-half payable March 1, the remainder Sept. 1.

*Oregon Railway & Navigation Co.*, 2½ per cent., quarterly, payable Feb. 1. Transfer books close Jan. 20. This company increases from 2 to 2½ per cent.

*St. Paul, Minneapolis & Manitoba*, 2 per cent., quarterly, payable Feb. 1. Transfer books close Jan. 22.

*South Carolina*, 5 per cent. on the income bonds for the year 1882, payable Feb. 1.

#### American Society of Civil Engineers.

The annual meeting began in New York, Jan. 17. The usual reports were presented by the directors, the Treasurer and the Finance Committee. Reports were also presented by the Special Committees on Cements, on the Preservation of Timber, and on Standard Time, all reporting progress. Several amendments to the constitution were presented.

Papers on the Increased Efficiency of Railroads, by Messrs. W. P. Shion, John B. Jervis and Charles Paine were presented and partly discussed.

On the following day the members were to visit several points of interest in the city.

#### Southern Railway and Steamship Association.

The adjourned annual meeting was held in Washington, Jan. 17. The usual routine business was transacted and the old officers were re-elected.

The principal event of the meeting was the admission as members of the East Tennessee, Virginia & Georgia and the Richmond & Danville companies. These companies have generally—though not always—acted in harmony with the Association, but have not been members.

#### ELECTIONS AND APPOINTMENTS.

*American Society of Civil Engineers.*—At the annual meeting in New York, Jan. 17, the following officers were chosen: President, Charles Paine; Vice-Presidents, W. H. Paine, Henry Flad; Secretary and Librarian, John Bogart; Treasurer, J. James R. Cross; Directors, G. S. Green, Jr., J. P. Davis, Wm. Metcalf, W. E. Merrill, Wm. G. Hamilton.

*Ashburnham.*—At the annual meeting in Ashburnham, Mass., last week, the following directors were chosen: Geo. C. Winchester, Geo. G. Rockwood, John H. Wilkins, C. M. Proctor, E. C. Field.

*Atchison, Topeka & Santa Fe.*—Mr. Charles H. Wood is appointed General Agent at Kansas City, Mo., and will also have charge of the Kansas City and Argentine stations.

*Augusta, Eberton & Chicago.*—Mr. Charles S. Dwight is appointed Chief Engineer, with office in Winsboro, S. C. He was recently Chief Engineer on the Chester & Lenoir road.

*Baltimore, Pittsburgh & Chicago.*—At the annual meeting in Pittsburgh, Jan. 15, the following were chosen: President, Wm. E. Schmetz, Pittsburgh; directors, S. Beyer, Wm. Vankirk, D. W. C. Carroll, John G. Holmes, Charles L. Caldwell, F. B. Laughlin, Joshua Rhodes, J. D. Long, James M. Bailey, Pittsburgh; Jacob Frick, John Zimmerman, Wooster, O.; James S. Robinson, Kenton, O.

*Bell's Gap.*—At the annual meeting in Philadelphia last week the following were chosen: President, Charles F. Berwind; directors, J. R. Converse, J. N. DuBarry, Aaron Fries, Frank S. Lewis, John Reilly.

*Bradford, Bordell & Kinzua.*—At the annual meeting last week the following officers were chosen: President, J. J. Carter; Vice-President and General Manager, R. G. Taylor; Secretary and Auditor, J. E. Ransom; Treasurer, B. W. Spencer; Directors, R. C. Vilas, H. G. Nolton, G. R. Blanchard, B. W. Spencer, E. M. Clymer, H. F. Sweetser, A. I. Wilcox, W. W. Brown, Geo. A. Eckbert.

*Bradford, Bordell & Smethport.*—At the annual meeting last week the following officers were chosen: President, W. W. Brown; Vice-President, R. G. Taylor; Secretary and Auditor, J. E. Ransom; Treasurer, B. W. Spencer; Directors, R. C. Vilas, H. G. Nolton, B. W. Spencer, E. M. Clymer, A. I. Wilcox, W. W. Brown, Geo. A. Eckbert.

*Brattleboro & Bennington.*—This company was organized Jan. 9 by the election of the following directors: Edward Crosby, J. J. Estey, Kittredge Haskins, W. W. Lynde, Brattleboro, Vt.; O. E. Butterfield, J. H. Kidder, Wilmington, Vt.; W. P. Jones, H. G. Porter, Wilmington, Vt.; A. J. Tucker, Halifax, Vt.; Clerk, T. W. Childs.

*Chicago & Alton.*—Mr. Morris D. Mason has been appointed Assistant Superintendent of the Kansas City Division, with office in Kansas City, Mo. He has been Train-Master for some time.

*Chicago, Burlington & Kansas City.*—Mr. C. M. Levey is appointed Assistant Superintendent, with office in Keokuk, Iowa.

*Chicago & Evanston.*—At the annual meeting in Chicago, Jan. 9, the following directors were chosen: Jason C. Easton, E. K. Hubbard, S. S. Merrill, F. W. Wadsworth, E. Walker. The company is controlled by the Chicago, Milwaukee & St. Paul.

*Chicago & Great Southern.*—The officers of this road are: Contractor and Manager, Henry Crawford; Chief Engineer, J. O. Baird; Superintendent, Henry Crawford, Jr. Office in Chicago.

*Chicago & Northwestern.*—Mr. W. H. Dixon has been appointed Northwestern Passenger Agent. He has been for some time Secretary of the Western Trunk Lines Association.

*Chicago & Western Indiana.*—The board of directors has been reorganized and is now as follows: A. L. Hopkins, Wabash, St. Louis & Pacific; Robert Harris, Chicago & Atlantic; E. B. Stahlman, Louisville, New Albany & Chicago; D. J. Mackey, Chicago & Eastern Illinois; S. R. Callaway, Chicago & Grand Trunk. The board has elected S. R. Callaway President. It is understood that the presidency is to go in rotation to the five companies owning the road.

*Cincinnati, New Orleans & Texas Pacific.*—At the annual meeting of this company (lessee of the Cincinnati Southern) in Cincinnati, Jan. 15, the following directors were chosen: T. T. Gaff, A. A. Goodman, Edgar M. Johnson, A. McDonald, Otto Flock, John Scott, Briggs Swift. Messrs. Gaff and Swift are new directors, succeeding Theodore Cook and Frederick Wolfe. The board elected John Scott President and General Manager; Edgar M. Johnson, General Counsel; H. H. Latam, Secretary and Treasurer.

*Cleveland, Columbus, Cincinnati & Indianapolis.*—Mr. Thomas Burrows has been appointed Superintendent of the Indianapolis Division and the Indianapolis & St. Louis road in place of C. C. Gale, resigned. Mr. M. Peck, late Train-Master, succeeds Mr. Burrows as Assistant Superintendent.

*Columbus, Hocking Valley & Toledo.*—At the annual meeting in Columbus, O., Jan. 9, the following directors were chosen: M. M. Greene, S. Burke, Charles G. Hickox,

C. H. Andrews, W. J. McKenzie, J. W. Ellis. The board elected the following officers: M. M. Green, President; S. Burke, Vice-President; W. M. Green, Secretary; F. H. Medary, Treasurer.

*Delaware.*—At the annual meeting in Dover, Del., Jan. 11, the following directors were elected: S. M. Felton, Isaac Hinckley, Andrew C. Gray, Charles Warner, Christian Febriger, Edmund Smith, Isaac Jump, H. B. Fiddeman, Manlove Hayes, Alexander Johnson, James J. Ross, Albert Curry, J. Turpin Moore. The board re-elected S. M. Felton, President; Manlove Hayes, Secretary and Treasurer. The road is leased to the Philadelphia, Wilmington & Baltimore.

*Delaware Western.*—The new board has elected W. H. Ijams Treasurer; W. T. Thelin, Auditor; John C. Farra, Cashier.

*Galveston, Houston & Henderson.*—The directors of this company as reorganized are: W. P. Bollinger, W. H. Harding, Allen McCoy, Galveston, Tex.; James A. Baker, A. F. Rice, Houston, Tex.; Jay Gould, Russell Sage, New York. The board has elected W. H. Harding, President; D. S. H. Smith, Secretary and Treasurer.

*Grand Marais & Vermilion.*—The officers of this new company are: President, W. W. Spalding; Vice-President, T. W. Mayhew; Secretary, J. W. Miller; Treasurer, Hazael Mayhew. Office at Grand Marais, Minnesota.

*Lake Erie, Wooster & Muskingum Valley.*—The old officers have been re-elected as follows: President, J. H. Kauke; Vice-President, W. A. Underwood; Secretary, J. N. Clark; Treasurer, H. McClarran; Chief Engineer, J. F. Wallace; Assistant Engineer, John Herron. Offices in Wooster, Ohio.

*Lancaster.*—At the annual meeting in Lancaster, Mass., Jan. 16, the following directors were chosen: G. A. Parker, G. W. Howe, S. R. Merrick, A. R. Powers, F. D. Brigham, F. W. Warren, A. Maynard, C. H. Waters, Robert Codman.

*Lehigh Valley.*—At the annual meeting in Philadelphia, Jan. 15, the following officers and directors were chosen: President, Henry E. Packer; Vice-President, Charles Hartsborne; Directors, R. A. Packer, W. L. Conyngham, Ario Pardee, Wm. A. Ingham, George E. Markle, Robert H. Sayre, James I. Blaklee, E. P. Wilbur, Joseph A. Patterson, Garrett B. Landerman, John R. Fell.

Mr. H. E. Packer, the new President, is a son of the late Asa Packer. Mr. Hartsborne has been President since Judge Packer's death, and now returns to his old position as Vice-President.

*Memphis & Little Rock.*—Mr. H. G. Fleming, Chief Engineer, is appointed Superintendent also, in place of W. E. Smith, resigned.

*Minneapolis & St. Louis.*—Mr. W. H. Truesdale has been appointed assistant to the President, Mr. J. T. Clark succeeds Mr. Truesdale as Assistant Traffic Manager.

*Morgan's Louisiana & Texas.*—Mr. A. C. Hutchinson, President of this company, makes the following announcement: "In consequence of the death of Mr. Chas. A. Whitney, the powers and authority heretofore exercised by the General Managers, under the firm of Chas. A. Whitney & Co., are withdrawn, and the business of the company will, after this date, be conducted by the duly appointed department officers. Agents and connections will please be governed accordingly, and until further notice, address communications on business connected with their departments to following officers: A. C. Hutchinson, President; J. G. Shriver, Acting Vice-President and Traffic Manager; Geo. Pandely, Superintendent Louisiana Railroad Division; John B. Richardson, Secretary; Chas. M. Whitney, Treasurer; Newell Tilton, Assistant General Superintendent and Master Mechanic; E. M. Underhill, Auditor."

*Mount Desert.*—The officers of this new company are: President, W. B. Hayford, Bangor, Me.; Clerk and Treasurer, T. H. Clergue.

*Mt. Vernon & Tamaroa.*—The directors of this company are: B. F. Johnston, P. M. Johnston, J. H. Johnston, A. M. Johnston, A. G. Brown, St. Elmo, Ill.; G. W. Evans, Mt. Vernon, Ill.; B. W. Henry, Vandalia, Ill.; J. P. Howard, Effingham, Ill.

*New York, Chicago & St. Louis.*—Mr. F. B. Boatman has been appointed Master Mechanic, with office in Cleveland, Ohio.

*New York & Greenwood Lake.*—Mr. Stephen Smith has been appointed Superintendent in place of James H. Tenny, who goes to the New York, Lake Erie & Western road. Mr. Smith was recently Train-Dispatcher for the Erie in Jersey City.

*New York & New England.*—Owing to the necessity for perfecting a thorough system of standards for the equipment of this company, and the extensive work in designing mechanical appliances in connection with the docks, warehouses, steamboats, elevators, etc., the office of Mechanical Engineer is created, and Mr. A. K. Mansfield is appointed to the position, with headquarters at Boston. He will have charge of the design of mechanical work in connection with all departments, and will assist the General Manager in such other matters as may be assigned to him from time to time.

*New York, Ontario & Western.*—At the annual meeting in New York, Jan. 17, the following directors were chosen: Wm. Adams, Henry Army, Charles J. Canda, Thomas C. Clarke, George B. Greer, Theodore Houston, Conrad N. Jordan, Howard Mansfield, John L. Nisbet, Horace Porter, Alexander Taylor, E. F. Winslow, C. F. Woerishoffer.

*New York, West Shore & Buffalo.*—The new board has elected Horace Porter, President; Theodore Houston, Vice-President; John L. Nesbitt, Secretary; F. E. Worcester, Treasurer.

*Norwich & Worcester.*—At the annual meeting, Jan. 10, the following directors were chosen: Francis H. Dewey, Edward L. Davis, Thomas B. Eaton, Charles W. Smith, Worcester, Mass.; John L. Slater, Norwich, Conn.; Wm. G. Weld, Newport, R. I.; W. Bayard Cutting, New York. The board elected Francis H. Dewey, President; E. T. Claup, Clerk; George L. Perkins, Treasurer; P. St. M. Andrews, Managing Agent under the lease to the New York & New England Co.

*Norfolk & Western.*—At the annual meeting in Norfolk, Va., Jan. 10, the following were chosen: President, George F. Tyler; Directors, Clarence H. Clark, F. J. Kimball, Edward A. Rollins, John C. Bullitt, James P. Scott, William B. Isham, George C. Clarke, R. B. Minturn, Upton L. Boyce, John B. Whitehead, J. Arthur Johnson, Charles Hacker. The board elected officers as follows: First Vice-President, F. J. Kimball; Second Vice-President, Henry Fink; Treasurer, William G. McDowell; Assistant Treasurer, M. C. Jameson; Secretary, G. R. W. Ames; Auditor, E. E. Portlock; General Counsel, Hon. William J. Robert-

son; Solicitor, Joseph J. Donnan; Assistant Solicitor, John W. Brock.

*Oley Valley & Lehigh.*—At the annual meeting, Jan. 8, the following were elected: President, George Brooke, Birdsboro, Pa.; directors, George D. Stitzel, Hiram Y. Kaufman, R. B. Kinsey, George K. Lora, John B. Bertolet, Israel M. Bertolet, Samuel K. Cleaver, E. M. Davis, John O. Keim.

*Pennsylvania Company.*—Mr. John E. Davidson has been chosen Treasurer in place of W. H. Barnes, resigned. Mr. John W. Renner succeeds Mr. Davidson as Assistant Comptroller.

*Pittsburgh, Cincinnati & St. Louis.*—Mr. John E. Davidson has been chosen Treasurer in place of M. C. Spencer, resigned. Mr. John W. Renner succeeds Mr. Davidson as Assistant Comptroller, and Mr. Albert McElvey is appointed Auditor to succeed Mr. Renner.

*Port Huron & Northwestern.*—Mr. C. C. Jenkins, General Freight Agent, is appointed General Passenger Agent also. Office at Port Huron, Mich.

*Portland & Ogdensburg.*—At the annual meeting in Portland, Me., Jan. 16, the old directors were re-elected. The board subsequently re-elected Samuel J. Anderson President; Charles U. Foye, Clerk; John W. Dana, Treasurer; Jonas Hamilton, Superintendent; John F. Anderson, Chief Engineer.

*Rew City & Eldred.*—At the annual meeting last week the following officers were elected: President, J. J. Carter; Vice-President and General Manager, R. G. Taylor; Secretary and Auditor, J. E. Ransom; Treasurer, B. W. Spencer; Directors, R. C. Vilas, H. G. Nolton, B. W. Spencer, E. M. Clymer, A. I. Wilcox, W. W. Brown, George A. Eckbert.

*St. Anthony.*—The officers of this company are: President, H. R. Murdock; Vice-President, J. D. Van Norman; Secretary and Treasurer, C. H. Smith. Office in Minneapolis, Minn.

*St. Louis, Keokuk & Northwestern.*—Mr. C. M. Levy is appointed Assistant Superintendent, with office in Keokuk, Iowa.

*St. Louis, Vandalia & Terre Haute.*—At the annual meeting in Greenville, Ill., the old directors were re-elected. The board subsequently re-elected Thomas D. Messier, President; Williamson Plant, Secretary and Treasurer. The road is leased to the Terre Haute & Indianapolis Co.

*Saratoga, Mt. McGregor & Lake George.*—At the annual meeting last week the following directors were chosen: John Kellogg, John Warner, James H. Hurst, George West, James Arkell, William J. Arkell, J. W. Drexel, H. N. Lockwood, A. G. Richmond, Benjamin Smith, D. McGregor, Douw H. Fonda, George Kellogg. The board elected John Kellogg, President; W. J. Arkell, Vice-President; A. B. Frey, Secretary and Treasurer; D. H. Fonda, General Manager.

*Southern Railway & Steamship Association.*—At the adjourned annual meeting in Washington, Nov. 15, the old officers were re-elected as follows: President, Joseph E. Brown; General Commissioner, Virgil Powers; Secretary, C. A. Sindall; Arbitrator, T. H. Carter; Auditor, T. E. Walker; Rate Committee, W. H. Stanford, Sol. Haas, R. A. Anderson, G. A. Whitehead, S. B. Pickens, J. M. Brown, J. M. Culp and E. P. Wilson.

*South Pennsylvania.*—At the annual meeting in Harrisburg, Pa., Jan. 8, H. K. Sheldon was chosen President; Frederick T. Grotevent, Secretary and Treasurer.

*Utica, Clinton & Binghamton.*—At the annual meeting in Utica, N. Y., Jan. 15, the following directors were chosen: George B. Phelps, A. N. Sheldon, Frank L. Beebe, Allen Curtis, John W. Lippitt, Allen W. Reynolds, James I. Scollard, William S. Bartlett, R. S. Williams, John Thorn, W. M. Storrs, Isaac Maynard, G. W. Adams. The board elected Isaac Maynard President; George B. Phelps, Vice-President; Robert S. Williams, Secretary and Treasurer.

*Wabash, Chester & Western.*—At the annual meeting in St. Louis, Jan. 8, the following directors were chosen: G. B. Allen, Levi Boggy, H. M. Camp, Nathan Cole, C. B. Cole, H. C. Cole, Morton Crane, J. Wynan Jones, C. B. Preston. The board elected J. Wynan Jones, President; C. B. Cole, Vice-President; Newton Crane, Secretary; Nathan Cole, Treasurer.

*Wabash, St. Louis & Pacific.*—Mr. E. N. Armstrong is appointed Superintendent of the Chicago Division, in place of A. A. Hobart, who has gone to another road. Mr. E. Dresser succeeds Mr. Armstrong as Superintendent of the Iowa Division.

*Wabash, St. Louis & Pacific Leased Lines.*—At meetings held in Des Moines, Ia., directors were chosen for the following companies, all controlled by the Wabash: *Des Moines Northwestern.*—Jay Gould, A. L. Hopkins, Solon Humphries, James F. How, J. S. Rannels, F. M. Hubbell, J. S. Clarkson, C. F. Meek, J. S. Polk. *Des Moines & St. Louis.*—J. S. Rannels, F. M. Hubbell, J. S. Polk, J. S. Clarkson. *St. Louis, Des Moines & Northern.*—J. S. Clarkson, J. S. Polk, F. M. Hubbell, J. S. Rannels, C. F. Meek.

*West Chester.*—At the annual meeting, Jan. 14, the following officers were chosen: President, John P. Green; Directors, John M. Kennedy, Wistar Morris, Henry M. Phillips, George B. Roberts, N. Parker Shortridge, J. Price Wetherill. The Pennsylvania Railroad Co. controls and operates the road.

*Western Railroad Association.*—At the annual meeting in Chicago, Jan. 10, the following directors were chosen: B. F. Ayer, Illinois Central; B. C. Cook, Chicago & Northwestern; A. L. Osborn, Michigan Central; Wirt Dexter, Chicago, Burlington & Quincy; T. F. Withrow, Chicago, Rock Island & Pacific; T. B. Blackstone, Chicago & Alton; Charles Paine, New York, West Shore & Buffalo; C. W. Rogers, St. Louis & San Francisco; S. S. Merrill, Chicago, Milwaukee & St. Paul; M. H. Smith, Louisville & Nashville; S. R. Callaway, Chicago & Grand Trunk; J. C. Brown, Missouri Pacific. The officers chosen are as follows: President, B. F. Ayer; General Counsel, George Payson; Secretary and Treasurer, J. H. Raymond; Executive Committee, B. F. Ayer, B. C. Cook, A. L. Osborn, T. B. Blackstone and T. F. Withrow.

*West Virginia Central & Pittsburgh.*—At the annual meeting, Jan. 8, the following directors were chosen: Alexander Shaw, James G. Blaine, Augustus Schell, S. D. Elkins, Wm. Keyser, J. M. Camden, T. Sicks, Wm. H. Barnum, H. G. Davis, Thos. B. Davis. The board elected H. G. Davis President; S. D. Elkins, Vice-President.

*Worcester & Nashua.*—At the annual meeting, Jan. 11, the following directors were chosen: Francis H. Dewey, Francis H. Kinnicut, Stephen Salisbury, J. Edwin Smith, E. B. Stoddard, Charles S. Turner, Samuel Woodward, Worcester, Mass.; Henry N. Bigelow, Clinton, Mass.; Charles Holman, Nashua, N. H. There is no change from last year. The board re-elected C. S. Turner, President and General Manager; T. W. Hammond, Clerk.



## PERSONAL.

—Mr. C. D. Williams has resigned his position as Superintendent of the Bradford, Eldred & Cuba road.

—Mr. B. C. Williams has resigned his position as Superintendent of the Bradford, Bordell & Kinzua Railroad.

—Mr. W. E. Smith, for some time past Superintendent of the Memphis & Little Rock road, has resigned his position.

—Mr. M. C. Spencer has resigned his position as Treasurer of the Pittsburgh, Cincinnati & St. Louis Co., after several years service.

—Mr. Hugh Riddle, President of the Chicago, Rock Island & Pacific Co., has taken a leave of absence and has gone to Southern California. He will probably remain there until Spring.

—Mr. T. A. Philips has resigned his position as General Manager of the Toledo, Cincinnati & St. Louis road. Mr. Philips will probably go, for a time at least, to Texas, where he has property.

—Messrs. Henry B. Payne and Amasa Stone have tendered their resignations as directors of the Lake Shore and Michigan Southern Co. The resignations have not yet been accepted by the board.

—Mr. W. R. Crumpton, recently Division Superintendent on the Chicago, Burlington & Quincy road, has formed a connection with the American Brake Co., of St. Louis, and takes charge of the Chicago office.

—Mr. Henry Villard, President of the Northern Pacific and the Oregon Railway & Navigation companies, has presented the University of Oregon with \$50,000 in Northern Pacific bonds as the beginning of an endowment fund.

—Mr. W. H. Barnes has resigned his position as Treasurer of the Pennsylvania Company on account of continued ill health. Mr. Barnes has been connected with the Pennsylvania's Western lines in various capacities for over 20 years.

—Mr. C. C. Gale has resigned his position as Superintendent of the Indianapolis Division and the Indianapolis & St. Louis line of the Cleveland, Columbus, Cincinnati & Indianapolis road on account of ill health. Mr. Gale entered the service of the road as a brakeman over 30 years ago, and has been with it ever since in various capacities.

—The resignation of Mr. S. T. Fuller as Chief Engineer and General Superintendent of the Mexican National lines was tendered on account of his desire to return to the United States for the purpose of supervising the education of his only daughter. Mr. Fuller wished to retire some time ago, and only remained until now at the urgent request of the officers of the company.

—Col. Charles L. Schlatter, who has been connected with the Brunswick & Albany road from its first organization, remains in charge of it under the new ownership as General Manager. Col. Schlatter has been an advocate and an officer of the company since the road was first projected, 28 years ago, and has stood by it through no less than thirteen reorganizations, a faithful believer in its final success, and in the development of Brunswick as a sea-port.

—Mr. J. D. Brown has resigned his position as Assistant General Passenger Agent of the Chicago, Milwaukee & St. Paul road, and will reside in Cleveland, O., for the present. Mr. Brown has been on the St. Paul road for a year and a half. Previous to that time, and for a period of ten years, he was General Passenger Agent of the Missouri, Kansas & Texas road, in which position he made a reputation as a wide-awake and clever railroad man.

—Mr. Thatcher Perkins, one of the oldest and best known master mechanics in the United States, died in Baltimore, Jan. 9. He was 70 years old, and his death was caused by injuries received by a fall on the ice. He was born at North Berwick, Me., in 1817. When a youth he learned the trade of machinist, and in 1837, when he came to Baltimore, he was employed at the Mt. Clare shops by the Baltimore & Ohio Railroad Company. By his ability and capacity for management he obtained the post of foreman in 1838. In the fall of 1839 he accepted an appointment as engineer on the road, but at the request of the company left his locomotive the following summer to again act as foreman. In 1847 he was appointed Master of Machinery. In 1855 he became the General Superintendent of the Central Ohio Railroad, and was shortly afterward appointed General Superintendent of the Tredegar Iron Works, Richmond, Va. In 1858 he again accepted the post of Master of Machinery with the Baltimore & Ohio Railroad. In 1865 he went to Pittsburgh and planned the shops of and erected machinery for the Pittsburgh Locomotive Works. About 1870 he accepted the post of Superintendent of Machinery with the Louisville & Nashville Railroad, which he held for several years. Lately advancing age and infirmities have kept him from active work.

## TRAFFIC AND EARNINGS.

## The Future of the Erie Canal.

Mr. Silas Seymour, the State Engineer and Surveyor, in his report on the New York canals recently submitted to the Legislature, says:

"First—The Erie Canal can never become self-sustaining, and at the same time compete successfully with rival lines of railway and other through channels of communication for the great bulk of the carrying trade between the great West and the Atlantic seaboard.

"Second—Inasmuch as the annual tonnage of the canals has not been materially increased since the completion of the present enlargement, there appears to be no encouragement for advocating a further enlargement at the enormous expense which it would entail upon the state unless it be to add one foot to the depth of the water on the levels between the locks, which would undoubtedly be of great advantage to navigation.

"Third—Judging from the present dilapidated condition of the canals, which has been brought about by the want of means necessary to keep them in good working order and at the same time prevent their rapid disintegration and decay, there can be no doubt that the prompt action of the Legislature and the people, in adopting the recent amendment to the constitution, affords the only means by which the usefulness of the canals can be perpetuated to the people of the state, by opening a free channel of water communication between the western lakes and their great commercial metropolis.

"Fourth—In order to realize to the fullest extent the benefits that are expected to result from this new departure in the canal policy of the state, the Legislature should promptly provide the means required for placing the canals in such perfect repair, and also for making such improvements in the prism and structures, together with such increased facilities for obtaining an adequate supply of water

as will enable the canals at all times during the season of navigation to be safely worked up to their full capacity, and all danger of detentions from breakages, blockades and other causes, be effectually avoided."

## RAILROAD EARNINGS.

Earnings for various periods are reported as follows:

Year ending Dec. 31:	1882.	1881.	Inc. or Dec.	P. c.
Buffalo, Pitts. & Western.....	\$295,475	\$295,679	I.	\$299,790 30.4
Central Pacific.....	25,713,150	24,094,099	I.	1,619,051 6.7
Chicago, St. P., Minn. & O.....	4,973,052	4,021,981	I.	951,071 23.5
Cin., Ind., St. L. & Chi.....	2,945,229	2,415,872	I.	529,357 21.9
Eastern.....	3,418,640	3,187,415	I.	231,225 7.1
Flint & Pere Marquette.....	2,159,927	1,875,146	I.	284,781 15.0
Gulf, Col. & Santa Fe.....	1,635,914	1,091,187	I.	544,727 50.0
Hannibal & St. Joseph.....	2,203,398	2,257,231	I.	53,833 2.0
Houston & Texas Central.....	3,175,580	3,748,658	D.	573,078 18.3
Illinois Central, Ill. Lines.....	6,914,897	6,738,961	I.	175,936 2.7
Iowa Lines.....	1,916,414	1,852,442	I.	63,972 3.5
Lake Erie & Western.....	1,477,567	1,978,532	I.	500,965 34.0
New York & New Eng.....	3,888,125	2,809,943	I.	1,078,182 38.4
Ohio Central.....	1,039,403	712,000	I.	327,403 40.0
Oregon Ry. & Nav.....	4,355,590	4,408,680	I.	53,090 1.2
St. L., Alton & Terre Haute, Main Line.....	1,371,532	1,424,853	D.	53,321 3.6
Belleville Line.....	873,798	754,094	I.	119,704 13.6
Scioto Valley.....	540,192	446,912	I.	93,280 17.0
South Carolina.....	1,313,748	1,245,287	I.	68,461 5.1
Wabash, St. L. & Pacific.....	10,738,358	14,407,789	I.	3,669,431 34.2
Eleven months ending Nov. 30:				
Burlington, Cedar Rapids & No. W. ....	\$3,554,617	\$3,026,224	I.	\$328,393 26.1
Ches. & Ohio.....	2,532,292	2,532,292	I.	574,418 23.1
Net earnings.....	965,180	420,050	I.	545,130 12.9
Chil., Bur. & Quincy.....	19,535,744	19,270,865	I.	264,879 1.3
Net earnings.....	881,547	907,804	I.	26,257 3.0
Des. Moines & Ft. Dodge.....	318,758	366,639	D.	47,881 15.0
Net earnings.....	93,181	26,708	I.	66,473 248.8
Eliz., Lex. & Big Sandy.....	452,226	452,226	I.	452,226 100.0
Net earnings.....	152,020	152,020	I.	152,020 100.0
Louisville & Nashville.....	11,759,923	10,190,583	I.	1,569,340 15.4
Net earnings.....	4,491,865	3,770,248	I.	721,617 19.2
Marquette, Hough. & Ont.....	1,174,425	884,519	I.	289,906 24.9
Net earnings.....	632,359	460,240	I.	172,119 26.7
Union Pacific.....	27,794,188	27,509,595	I.	284,593 1.0
Net earnings.....	13,110,789	12,241,331	I.	869,458 7.1
Utah Central.....	1,391,415	1,391,415	I.	1,391,415 100.0
Net earnings.....	905,329	905,329	I.	905,329 100.0
Month of November:				
Chicago, Bur. & Quincy.....	\$2,904,421	\$1,816,183	I.	\$1,088,238 21.1
Net earnings.....	1,390,402	903,153	I.	487,249 47.2
Eliz., Lex. & Big Sandy.....	611,188	611,188	I.	611,188 100.0
Net earnings.....	204,892	204,892	I.	204,892 100.0
Union Pacific.....	2,711,917	2,761,522	D.	49,605 1.8
Net earnings.....	1,021,056	912,216	I.	108,840 11.9
Month of December:				
Central Pacific.....	\$1,068,000	\$2,225,179	D.	\$237,179 11.5
Chil., Bur. & Quincy.....	375,798	432,615	D.	56,816 15.1
Cin., Ind., St. L. & Chi.....	2,945,229	2,415,872	I.	529,357 18.0
Eastern.....	249,391	248,308	I.	1,083 0.4
East Tenn., Va. & Ga.....	353,687	353,687	I.	353,687 100.0
Evansville & Terre Haute.....	54,576	54,576	I.	54,576 100.0
Flint & Pere Marquette.....	2,159,927	1,875,146	I.	284,781 13.3
Gr. Bay, Win. & St. P.....	37,676	44,025	D.	6,349 16.7
Gulf, Col. & Santa Fe.....	241,417	140,088	I.	101,329 72.4
Hannibal & St. Joseph.....	2,203,398	2,257,231	I.	53,833 2.4
Houston & Texas Central.....	3,175,580	3,748,658	D.	573,078 18.1
Illinois Central, Ill. Lines.....	545,092	558,085	D.	12,993 2.4
Iowa Lines.....	1,916,414	1,852,442	I.	63,972 3.3
Lake Erie & Western.....	1,477,567	1,978,532	I.	500,965 33.9
New York & New Eng.....	3,888,125	2,809,943	I.	1,078,182 27.8
Ohio Central.....	1,039,403	712,000	I.	327,403 31.5
St. L., Alton & Terre Haute, Main Line.....	1,371,532	1,424,853	D.	53,321 3.9
Belleville Line.....	873,798	754,094	I.	119,704 13.7
Scioto Valley.....	540,192	446,912	I.	93,280 17.1
South Carolina.....	1,313,748	1,245,287	I.	68,461 5.1
Wabash, St. L. & Pacific.....	10,738,358	14,407,789	I.	3,669,431 34.2
Wisconsin Central.....	105,163	94,679	I.	10,484 10.0
First week in January:				
Chicago & Eastern Illinois.....	1883.	1882.		
Chicago & Grand Trunk.....	\$295,475	\$295,679	I.	\$299,790 7.9
Chicago, Mil. & St. P.....	24,094,099	24,094,099	I.	24,094,099 100.0
Chicago & Northwestern.....	343,000	343,000	I.	343,000 100.0
Chicago & North Western.....	343,000	343,000	I.	343,000 100.0
Louisville & Nashville.....	201,640	201,640	I.	201,640 100.0
St. Paul, Minn. & W. P.....	291,566	291,566	I.	291,566 100.0
Wabash, St. L. & Pacific.....	291,566	291,566	I.	291,566 100.0
Second week in January:				
Denver & Rio Grande.....	\$95,300	\$109,500	D.	\$13,200 13.1

## GRAIN MOVEMENT.

For the week ending Jan. 6 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets, and receipts at the seven Atlantic ports have been in bushels, for the last ten years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874.....	3,027,412	1,820,106	1,207,306
1875.....	1,871,271	1,790,946	80,325
1876.....	1,790,946	946,652	844,294
1877.....	2,391,038	908,682	1,482,356
1878.....	1,452,608	1,112,056	340,552
1879.....	2,936,586	1,183,148	1,753,438
1880.....	3,867,056	1,370,697	2,496,359
1881.....	2,987,689	2,036,483	951,206
1882.....	2,710,050	1,530,064	1,179,986
1883.....	3,383,243	2,598,222	785,021

The receipts of the Northwestern markets for this, the first week of the year, were thus 60 per cent. more than last year, and more than in the corresponding week of any previous year. They were, however, nearly a third less than the week before, and smaller than in any week of last December. The shipments of these markets were also larger than in the corresponding week of any previous year and 52 per cent. more than last year. Of the total 175,293 bushels (7.8 per cent. of the whole) went down the Mississippi. The shipments were less than the week before, but more than in any other week since navigation closed. The receipts of the Atlantic ports were exceeded only in 1880, and were 156 per cent. more than last year, when throughout the winter they were exceptionally light, the shipments from the West, which were large in January and February, being absorbed in the interior of the East and South. Corn continues to be the largest item in the grain movement, though not if flour be included with wheat. The Atlantic receipts were 17 per cent. more than the week before, and the largest for four weeks.

Of the decrease from the previous week of 2,050,000 bushels in Northwestern receipts, 1,174,000 bushels was at Chicago, 300,000 at Milwaukee, 265,000 at Toledo, and 365,000 at St. Louis. The increase in Atlantic receipts was chiefly at New York and Boston. The Boston receipts were the largest since the first week of May, and were equalled in only three weeks of 1882:

Of the exports of this week (2,391,045 bushels), 880,794 bushels went from Baltimore; 748,490 from New York; 345,671 from New Orleans; 174,444 from Boston; 93,371 from Portland, and 78,875 from Philadelphia. More than a third of the exports were corn, and more than half of this went from Baltimore. Of the 232,814 barrels of flour exported 70 per cent. went from New York and 22 per cent. from Boston.

For the week ending Jan. 10 for three years Atlantic exports have been:

	1883.	1882.	1881.
Flour, bbls.....	208,061	61,777	180,310
Grain, bus.....	2,589,941	1,128,497	1,800,826

Taking flour and grain together the exports were 70 per cent. more than last year and 28 per cent. more than in 1881—were, indeed, large for the season.

For the week ending Jan. 13 receipts and shipments at Chicago and Milwaukee were:

	1883.	1882.	1881.
Flour, bbls.....	183,692	332,763	236,883
Grain, bus.....	2,314,715	1,530,650	2,079,487

There is a decrease of 43 per cent. in the flour receipts,

and of 9 per cent. in the grain receipts, but an increase of 39 per cent. in the flour shipments, and of 32 per cent. in grain shipments. Both receipts and shipments were exceptionally large in this and four or five following weeks last year, taking advantage of the low rates to the East which were about to be advanced.

For the week ending Jan. 13 receipts at four Eastern ports have been, for four years:

Bushels:	New York.	Boston.	Phila.	Baltimore.	Total.
1883.....	1,007,945	507,950	333,050	512,925	2,362,470
1882.....	805,835	236,155	161,300	160,038	1,363,328
1881.....	818,010	11,980	229,195	420,268	1,579,453
1880.....	1,216,221	37,067	345,400	423,441	2,222,129

P. c. of total:

1883.....	42.7	21.5	14.1	21.7	100.0
1882.....	59.1	17.3	11.8	11.8	100.0
1881.....	43.5	21.9	12.2	22.4	100.0
1880.....	54.7	10.7	15.5	19.1	100.0

The receipts of Philadelphia and Baltimore together were 35.8 per cent. of the whole this year, against 23.6 per cent. last year, 34.6 in 1881, and 34.6 in 1880.

Exports from San Francisco for the six months of the California crop year from July 1 to Dec. 31 was as follows, flour in barrels and wheat in bushels, flour being reduced to wheat in the totals:

	1882.	1881.	Inc. or Dec.	P. c.
Flour.....	549,151	423,391	I.	125,760 29.7
Wheat.....	15,229,353	21,326,162	D.	6,096,809 28.6

Total, bushels, 17,975,108 23,443,117 D. 5,468,009 23.3

About 90 per cent. of the wheat went to Great Britain and about 6 per cent. to Belgium, the rest going chiefly to Cape-town, St. Vincent and Central America. Great Britain also took about 60 per cent. of the flour, China about 20 per cent., Central America, Australia and the Pacific islands taking the rest.

Exports of California barley by sea for the six months ending Dec. 31 were 167,505 casks, an increase of 91,894 casks or 121.5 per cent., over the corresponding half of 1881. Shipments overland for the five months to Nov. 31 were 7,998 casks only—a very light traffic.

## COAL.

Coal tonnages for the week ending Jan. 6 are reported as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Anthracite.....	430,734	371,298	I.	59,436 16.0
Semi-bituminous.....	88,506	75,044	I.	13,462 17.9
Bituminous, Penna.....	53,617	48,673	I.	4,944 10.1
Coke, Penna.....	45,964	45,964	I.	45,964 100.0

The anthracite market continues very dull, although production and shipments have been somewhat reduced by bad weather. The companies have agreed to suspend work three days in each week for the present.

Chicago coal receipts for the eight months from May 1 to Dec. 31, were as follows:

	1882.	1881.	Inc. or Dec.	P. c.
By lake.....	629,385	505,101	I.	124,284 24.6
By rail.....	325,199	323,241	I.	1,958 0.6

Total.....954,584 828,342 1,266,242 1,689,785

The increase in anthracite was 56,192 tons, or 13.6 per cent.; nearly all of this increase was in lake receipts. The increase in bituminous coal was 288,039 tons, or 17.0 per cent.; this was entirely in rail receipts, the lake receipts showing a small decrease. The increase in receipts of all kinds was 344,221 tons, or 13.3 per cent.

For the year ending Dec. 31 the shipments of coal from the Monongahela River above Pittsburgh, as shown by the report of the Monongahela Navigation Co., were, in bushels:

	1882.	1881.	Inc. or Dec.	P. c.
Coal.....	101,434,700	86,254,660	I.	15,180,040 17



kin Valley and the Seaboard & Roanoke roads. This is, therefore, to give you notice that this company will not receive payment upon freight shipped from and destined to points above named beyond Charlotte, N. C., to which point it will demand its full local rates; that it will receive no such freight unless prepaid to Charlotte, N. C., and that having given notice of its inability to forward such freight beyond Charlotte, N. C., the shipper of the line receiving goods for shipment must assume all risk of damage that may occur to the same."

#### RAILROAD LAW.

##### Speed of Trains—Negligence.

In Powell against the Missouri Pacific Co., the Missouri Supreme Court lately held:

1. In an action for negligently causing death (by running over a person) by a railroad train, the Court holds that, aside from statutory or municipal regulation, no rate of speed is negligence per se.

2. Where the evidence introduced by the plaintiff shows that, although the defendant's train was running at a high rate of speed, still there was no connection between the rate of speed and the accident, but that the injury was caused by the forgetful and neglectful state of the deceased at the time, it is the duty of the trial court to direct a verdict for the defendant.

##### Municipal Taxation of Railroads in Georgia.

The United States Supreme Court has given its decision in the case of the Mayor and Aldermen of the city of Savannah against Morris K. Jesup, surviving trustee, et al. This was an appeal from a decree of the Circuit Court of the United States for the Southern District of Georgia, denying a claim made by the city of Savannah against the Atlantic & Gulf Railroad Company for taxes alleged to be due for the years 1877 and 1878. The city maintained that it was entitled in equity to be paid out of the moneys in the hands of the Receiver of the road before the payment of certain bonds secured by mortgages on the railroad property. This court holds that the Legislature of Georgia did not intend, when imposing taxation for the state upon the properties of railroad companies, as was done by the statute of 1874, to put upon the same property the additional burden of municipal taxation, which, but for that act, would have been forbidden by the charters of those companies, and that the railroad company could not be subjected to additional taxation upon the part of the city of Savannah without further legislation to that end. The decree of the Circuit Court denying the city's claim is therefore affirmed. Opinion by Justice Harlan; Justice Miller dissenting.

##### Common Carriers' Duties.

It will be remembered that at the time of the freight handlers' strike in New York, application was made to the Supreme Court for a writ of *mandamus* to compel the companies to receive freight and forward it without delay. The case was heard by Judge Haight, who refused the writ. An appeal was taken and the Court at General Term now decides that the writ should be granted. The decision is very long, and holds in substance that a railroad company is a public corporation, charged with certain duties to the public, and that the remedy sought in this case was a proper one. It was the duty of the companies to forward all freight offered without unreasonable delay, and the strike of laborers was not a sufficient excuse for their failure to perform this duty.

Of course the immediate occasion for the writ has passed, but the decision establishes a principle, and in that light it may be carried up to the Court of Appeals.

#### OLD AND NEW ROADS.

**Arkansas Midland.**—A suit has been begun against this company to recover on \$1,300,000 Arkansas state bonds issued to the old Arkansas Central Co., and afterwards repudiated by the state. The suit is based upon the recent decision in the Little Rock & Fort Smith bond case.

**Arkansas, New Mexico & Pacific.**—A bill is before Congress to incorporate this company with the right to build a railroad from Fort Smith, Ark., through the Indian Territory, following generally the line of the Canadian River and through New Mexico to Albuquerque, where connection will be made with the Atchison, Topeka & Santa Fe and the Atlantic & Pacific roads. The incorporators are members of the Seney syndicate, which owns the East Tennessee, Virginia & Georgia roads, and has charters for a line across Arkansas.

**Augusta, Elberton & Chicago.**—Surveys have been begun of the line of this road from Augusta, Ga., to Elberton, about 70 miles.

**Augusta & Knoxville.**—At a meeting called to consider what could be done to make up the January on its bonds which this company failed to pay on Jan. 1, resolutions were passed authorizing the directors to sell or lease the road on the best terms which can be obtained.

**Baltimore, Pittsburgh & Chicago.**—At a meeting held Jan. 15 it was announced that arrangements had been made for the right of way into Pittsburgh, and that work would soon be begun on the line from that city to Akron, O. A committee was appointed to inspect the location and let contracts.

**Boston Grade Crossings.**—The Massachusetts Railroad Commissioners have been giving special attention for some time to the subject of the grade crossings of the roads entering Boston from the north, and in their report just presented to the Legislature they present the following scheme for obviating grade crossings of steam railroads which enter Boston at the north end of the city:

"First. Let the Eastern Railroad take a part of the Boston & Maine Railroad location from the point of crossing near Somerville, and thus obviate the crossings of these roads at that place. Let the Boston & Maine run westerly of and parallel to the new line of the Eastern, and both enter the city on the Boston & Maine location (made wider, if necessary), running into a union passenger station at Haymarket square. The grade of both roads to remain substantially as at present to the point of crossing the Mystic Freight Railroad in Somerville, then rising enough to pass over the Fitchburg Railroad and Prison Point bridge, and continuing an elevated road to said station, passing over Causeway and Traverse streets. The Fitchburg Railroad and Prison Point bridge to be depressed about three feet, or nearly down to extreme high-water mark. If it should be thought desirable to use the land now used by the Eastern Railroad for passenger business, and the remaining portion of the Boston & Maine Railroad property for freight purposes, the tracks outside of the passenger tracks could be depressed after passing Austin street and Prison Point bridge.

"Second. The freight business of the two railroads, Boston & Maine and Eastern, which is not accommodated on the bridge over Charles River, or upon the premises belonging to the two railroads on Causeway street, should all be turned off into the extensive freight grounds belonging to

the Eastern and Boston & Maine railroads in Somerville and Charlestown. These grounds could be divided between the two roads, affording separate accommodation for each, or could be used as a union freight yard, which might be improved by the purchase of the state prison land, giving a frontage on Austin street.

"Third. The Mystic Freight Branch of the Boston & Lowell Railroad could be raised to pass over the Eastern and Boston & Maine railroads, also over Rutherford avenue and Main street in Charlestown, avoiding four dangerous crossings, two railroads and two highways. This branch would also pass above the Grand Junction Railroad, if the latter were kept at its present grade.

"Fourth. The Grand Junction Railroad, if changed, must be carried over both the Fitchburg and Boston & Lowell railroads, which would render it difficult to join the Eastern Railroad, and in any event would cross the Boston & Maine at grade, so that it seems hardly practicable to attempt to do away with the crossings of this road over the Fitchburg and Boston & Maine railroads.

"In carrying out the changes noted in the first and third sections, the grade of tracks could be made comparatively easy, being nowhere over 30 ft. per mile, and the alignment would not be very materially changed. Variations from the above plan would be to let each road, after passing Prison Point bridge, run down to the old level, and exchange passenger stations, or have a union station either at Haymarket square or on Causeway street. Another plan would be to bring in the Boston & Maine and Eastern railroads from Somerville nearly over the location of the present freight tracks of the Eastern Railroad, elevate both tracks after passing the Mystic Branch of the Boston & Lowell Railroad, and then run over the Fitchburg, as by the other plans. By this plan the freight business of the two roads could be kept entirely separate, the Eastern using the freight-yard on the east of its elevated passenger tracks, and the Boston & Maine using the freight-yard on the west of its elevated passenger tracks."

**Brattleboro & Bennington.**—The organization of this company has been completed under a charter granted by the Vermont Legislature. The road is to be of 3 ft. gauge and to run from Brattleboro, Vt., to Wilmington, and thence to Bennington. The towns on the line are asked to subscribe.

**Brunswick & Western.**—Work is to be commenced at once on the bridge at Albany, Ga., and the extension of this road (late the Brunswick & Albany) from that place to the Chattahoochee River, 60 miles. The road is to be carried through to Selma, Ala., 127 miles from the Chattahoochee and 358 miles from Brunswick, connecting there with the Memphis, Selma & Brunswick road, now in progress.

**Central, of New Jersey.**—It has been reported for several days that negotiations were pending for a lease of this road to the Lehigh Valley Co. These rumors were not much credited, especially as no lease could be made without consent of the Court, and the Chancellor would hardly authorize the Receiver to make a contract which would bind the stockholders. It is now announced that the reports have arisen from the fact that negotiations are pending for a new traffic contract between the two roads.

**Cincinnati & Eastern.**—Track on this road is now laid to Plum Run, O., 74 miles from Cincinnati and 2½ miles beyond the late terminus at Peebles. Trains begin to run to the new station this week. There are still 31 miles to be laid to reach Portsmouth.

As soon as trains are running to Portsmouth work will be begun on the proposed extension to Gallipolis, and on the extension of the Ohio River Branch from New Richmond to Aberdeen.

**Cincinnati, New Orleans & Texas Pacific.**—At the annual meeting in Cincinnati, Jan. 15, there was a long and somewhat excited discussion on the over-issue of stock made by the late George F. Doughty, when Secretary of the company. No proposition was made to the meeting and no action was taken. The company's counsel stated his belief that the company was not liable, admitting at the same time that there was a difference of opinion among lawyers on this point. The general opinion among the directors seemed to be that holders of the illegally issued stock would have to look to Doughty's estate for satisfaction of their claims.

The holders of the illegal stock recently held a meeting, and will soon hold another, to consider what can be done to establish their claims. It is quite probable that they will bring suit against the company.

**Columbus, Chicago & Indiana Central.**—It is announced that a final opportunity will be given to holders of bonds and stock to join in the agreement of reorganization. Holders may sign the agreement and deposit their securities with the Union Trust Co. in New York until Jan. 22 at 3 p. m., when the agreement will be finally closed. Purchasing Committee's receipts will be given for all securities deposited.

**Connecticut River.**—At the annual meeting in Springfield, Mass., an attempt was made by Mr. A. B. Harris, son of the late President, D. L. Harris, to oust Mr. N. A. Leonard, the present President. He failed to secure the co-operation of the other stockholders, however, and the old board was re-elected.

**Cresson, Clearfield & New York.**—An organization by this name is having surveys made for a railroad from Cresson, Pa., to a point on Clearfield Creek, where it is proposed to make connections with one of the new lines projected into the Clearfield coal region. The line will be about 40 miles long, and will open up some new coal territory.

**Danville, Olney & Ohio River.**—The Receiver gives notice that he intends to apply to the Court for authority to issue \$100,000 receiver's certificates for the purpose of settling pressing claims and putting the road in good order.

**Delaware, Lackawanna & Western.**—This company has begun to run coal trains through to Buffalo over its new Buffalo Division—the New York, Lackawanna & Western road. Through passenger trains will be put on in two or three weeks.

**Eastern Maine.**—This company has petitioned the Maine Legislature for authority to extend its road from Bucksport, Me., to Bar Harbor, with a branch from Ellsworth to Lamoine.

**East Tennessee, Virginia & Georgia.**—The new Georgia Division is now fully in operation. The stations on this division, with the distances from Chattanooga, are: Ooltewah, 15.2 miles; O'Brien, 20.2; Cobutta (junction with the Cleveland Branch), 26.7; Varnell, 30.9; Dalton, 40.0; Starks, 45.8; Carbondale, 49.9; Sugar Valley, 56.1; Skelley's, 61.3; Plainville, 67.1; Hermitage, 71.9; Rome, 80.0; Atlanta Junction (junction with Alabama Division), 82.2; Silver Creek, 85.5; Brice, 92.3; Seney, 93.9; Garfield, 96.7; Rockmart, 101.7; Braswell, 107.6; McPherson, 114.0; Dallas, 119.0; Hiram, 125.0; Powder Springs, 129.9; Austell (junction with Georgia Pacific),

134.7; Mableton, 138.9; Chattahoochee, 145.2; Six-mile Siding, 147.2; Simpson Street, 152.0; Atlanta, 153.0; Constitution, 159.1; Moore's Mill, 162.6; Ellenwood, 165.9; Stockbridge, 171.9; McDonough, 181.3; Locust Grove, 185.5; Jackson, 198.6; Indian Springs, 208.8; Frankville, 212.9; Juliette, 217.5; Dames' Ferry, 225.1; Holton, 232.2; Macon, 240.6 miles.

**European & North American.**—A bill in equity has been filed in the United States Circuit Court in Portland, Me., to have the reorganization of the company and the lease of the road to the Maine Central set aside. The suit is brought by Marcus P. Norton, of Boston, as trustee under the consolidated mortgage made at the time the Maine and New Brunswick companies of this name were consolidated in 1872. The consolidation was afterward broken up by foreclosure of underlying mortgages.

**Fitchburg.**—At the annual meeting, Jan. 30, the stockholders will be asked to authorize the issue of \$500,000 new 20-year, 5 per cent. bonds, for the purpose of funding the floating debt; also to authorize the directors to request the Vermont & Massachusetts Co. to issue \$1,000,000 new bonds, to be applied to the payment of the bonds of that company falling due in July next, and to repaying the Fitchburg Co. for improvements made on the leased road.

**Flint & Pere Marquette.**—The Boston *Advertiser* says: "When this company was reorganized in 1879 the plan specified that the common stock shall not be entitled to vote until the new company shall have earned and paid for five successive years 7 per cent. annual dividends on the preferred stock, but it was nowhere stated that the common stock forfeited its right to dividends during this period if they were earned. Recently the matter was brought to the attention of the directors by some of the common stockholders and they have agreed to allow a friendly suit to be brought to determine the rights of the common stockholders to dividends under the reorganization. The President of the company, the Hon. W. W. Crapo, believes that the common stockholders have no right to dividends, even though earned. Other directors and other lawyers hold a different opinion."

**Galveston, Harrisburg & San Antonio.**—The last rail on the line between San Antonio, Tex., and El Paso, 482 miles, was laid Jan. 12 near the Pecos Crossing, about 230 miles from San Antonio. Track was laid on all but about 10 miles last year, the completion of the gap being delayed by a tunnel and some heavy bridge work. This gives the Southern Pacific (by which this company is controlled) a complete line of its own through to Houston, Tex., and connections through to New Orleans.

**Georgia Pacific.**—On the section of 104 miles from Atlanta, Ga., to Anniston, Ala., only 10 miles remain to be completed, 94 miles of track being laid. From Anniston west to Birmingham, 63 miles, some 80 miles are graded, with work in progress on the rest. Contracts will soon be let on the 60 miles from Birmingham west, which is the only part of the work not now in progress. From Columbus, Miss., eastward track is now laid to Fayette Court House, Ala., 40 miles, and the grading is done some 25 miles further.

**Grand Marais & Vermilion.**—This company has been organized to build a railroad from Grand Marais, in Cook County, Minn., on the north shore of Lake Superior, west by north to Vermilion Lake, in St. Louis County, with a possible extension to the Manitoba line.

**Gulf, Colorado & Santa Fe.**—The purchase of the Chicago, Texas & Mexican Central road, from Dallas, Texas, to Cleburne, which was made by this company several months ago, has been finally completed, all the legal formalities having been complied with and a complete title finally transferred.

**Hannibal & St. Joseph.**—At a meeting of the board last week a statement was presented showing an increase of about 18 per cent. in the net earnings of 1882, over 1881. The board resolved to reduce the dividend on the preferred stock from 3½ to 3 per cent., in view of the extraordinary expenses incurred in the litigation with the state of Missouri.

**Hartford & Harlem.**—A dispatch from Hartford, Conn., says: "The New York & Connecticut Air Line Co. filed its survey for a parallel road between New Haven and New York in 1881 under the provisions of the general railroad law. The survey was thrown out by the Railroad Commissioners because it did not give the definite point in New Haven from which it would start. A definite survey has now been filed and the Commissioners have designated Jan. 31 as the time for a hearing. This earlier application takes precedence of the recent one of the proposed Hartford & Harlem road, and as the survey of the latter crosses that of the New York & Connecticut several times its interests may be materially affected should the Commissioners decide favorably upon the first application."

**Hudson Tunnel Railroad.**—All work on the tunnel under the Hudson is now suspended. Lack of money is the reason given and it is also understood that serious engineering difficulties are in the way of a further continuance of work on the original plan.

**Illinois Central.**—During the month of December the earnings of this company's lines were as follows:

	1882.	1881.	Decrease.	P. c.
In Illinois.....	\$543,092	\$583,085	\$39,993	6.8
In Iowa.....	153,959	180,390	26,431	14.7
Total.....	\$697,051	\$763,475	\$66,424	8.7

During December, 1882, the land sales were 1,721.29 acres for \$9,687.33, and the cash collected on land contracts was \$18,295.99.

Absurd reports have been current in the newspapers that Mr. Wm. H. Vanderbilt has been a large buyer of this company's stock, his object being to secure control of the company in order to hold complete possession of its Chicago station, which is also used by the Michigan Central. It was reported also that he had made arrangements to secure the co-operation of the Holland stockholders in his plans. There is absolutely nothing in these reports.

**Indiana, Bloomington & Western.**—In the matter of the appeal of Turner and others from the decision of the Circuit Court confirming the sale of the old Indianapolis, Bloomington & Western road under foreclosure, the United States Supreme Court has given its decision dismissing the appeal. The Court holds that the sale was in all respects fair and proper, and in accordance with the decree of foreclosure, from which no appeal was taken. The order confirming the sale is affirmed.

**Kansas City, Springfield & Memphis.**—Track on this road is laid to West Plains, Mo., 102 miles southwest from Springfield. The regular trains run to Cabool, 77 miles from Springfield, and will soon be extended to West Plains.

**Lake Erie, Wooster & Muskingum Valley.**—The grading of this road from Wooster, O., to the New York, Pennsylvania & Ohio at Burbank, 15 miles, is now nearly all completed. Track will not be laid until spring.



**Wilmington, Wrightsville & Jacksonville.**—Work is soon to be begun on this road, a considerable amount having been subscribed. The road is to run from Wilmington, N. C., north by east to Jacksonville, on a line parallel to the sea coast but some 30 miles back from it. The peculiarity of the project is that it is started by a colored man. Subscriptions are asked from colored men only, and all the employes of the road are to be colored men, as far as possible.